

TWO SECTIONS

JANUARY, 1940

SECTION 2

S · A · E JOURNAL



Index to Volumes 44 and 45

JANUARY-DECEMBER, 1939

Society of Automotive Engineers, Inc.

29 West 39th Street

New York

THE Index for the Transactions Section of the SAE Journal for 1939 is printed on the following pages. Page numbers for this Section are consecutive from January to December. The table below indicates the pages contained in each issue:

January	1-48
February	49-92
March	93-140
April	141-180
May	181-228
June	229-280
July	281-320
August	321-364
September	365-412
October	413-456
November	457-500
December	501-548

Following the Transactions Index there is printed the General Editorial Section Index.

Index to Transactions

Author Index

AUTHOR	TITLE OF PAPER	PAGE
Allen, Edmund T.	The Testing of Large Aircraft	444
Allen, Edwin L.	Body Engineering - Past, Present and Conjecture as to Future	365
Andreau, J.	European Streamlining Slashes Air Resistance	(E) 350
Andreau, J.	Modern European Light Cars	(E) 350
Appel, W. D.	Aspects of Frameless Car Design	535
Banks, F. R.	Aviation Fuels and Engines	389
Barton, C. H., and E. L. Bass	Aircraft-Engine Lubrication	8
Bass, E. L., and C. H. Barton	Aircraft-Engine Lubrication	8
Baster, F. S.	Why Not 125 BMEP in an L-Head Truck Engine?	72
Beard, M. G., and E. W. Fuller	Feathering Propellers in Airline Transport Operation	372
Berlin, Don R., and Peter F. Rossmann	Flush Riveting Considerations for Quantity Production	325
Bissell, Thomas A.	Trends in Design of 1940 Cars	457
Blackwood, A. J.; C. B. Kass, and O. G. Lewis	Multicylinder Engine Detonation and Mixture Distribution	125
Blok, H.	"Seizure-Delay" Method for Determining the Seizure Protection of EP Lubricants	193
Boyd, T. A.	Engine Flame Researches	421
Bray, Ulric B.; C. C. Moore, Jr., and David R. Merrill	Improvements in Diesel-Engine Lubricating Oils	35
Brooks, Donald B., and Robetta B. Cleaton	The Precision of Knock Rating - 1936-1938	449
Browne, K. A.	Dynamic Suspension - A Method of Aircraft-Engine Mounting	185
Bull, A. W.	Tire Behavior in Steering	344
Cleaton, Robetta B., and Donald B. Brooks	The Precision of Knock Rating - 1936-1938	449
Clements, Bishop	Magnaflux Indications Interpreted	68
Colwell, A. T.	The Trend in Poppet Valves	295
Crane, Henry M.	The Car of the Future	141
Davis, Ernest F.	What Is New in Heat-Treating Methods, Materials, Processes	351
Ellies, E. E.	The Development of Foamed-Latex Cushioning	93
Ewart, E. S.	Tire Design Factors Influencing Control of Vibration	43
Fisher, W. S.	Diesel-Engine Installation in Coaches and Trucks	305
Fuller, E. W., and M. G. Beard	Feathering Propellers in Airline Transport Operation	372
Gregory, A. T.	Progress in In-Line Engines	(E) 548
Gregory, A. T.	Progress in the Development of In-Line Air-Cooled Engines	(E) 548
Haushalter, F. L.	Rubber as a Load-Carrying Material	15
Hebl, L. E., and T. B. Rendel	Spark Timing - Its Relation to Road Octane Numbers and Performance	210
Heldt, P. M.	Recent European Developments in High-Speed Diesel Engines	77
Hendrickson, N. E.	Trends in Commercial-Vehicle Spring Suspension	104
Hersey, D. S.	Fuel-Economy Possibilities of Otto-Cycle Aircraft Engines	235
Hicks, H. A., and G. H. Parker	Harshness in the Automobile	1
Hood, Manley J.	Airplane Drag Caused by Rivet Heads	(E) 258
Hood, Manley J.	The Effects of Rivets and Surface Roughness on Wing Drag	(E) 258
Huber, Paul, and Ernest E. Wilson	Passenger-Car Road Noise	281
James, W. S.	Needed Tire Improvements	(E) 140
James, W. S.	Passenger-Car Tires as Seen Today by the Automotive Engineer	(E) 140
Jardine, Frank; A. H. Woollen, and D. S. Mussey	Light-Weight Transportation Units	526
Johnson, J. B.	Magnaflux - What Does It Show?	59
Johnson, R. E., and W. G. Lundquist	The BMEP Parameter for Airplane Cruising-Power Control	97

(E) indicates excerpt published.

S.A.E. TRANSACTIONS

AUTHOR	TITLE OF PAPER	PAGE
Kass, C. B.; O. G. Lewis, and A. J. Blackwood	Multicylinder Engine Detonation and Mixture Distribution	125
Kearns, Charles M.	Vibration Characteristics of Aircraft Engine-Propeller Systems	540
Ketcham, Howard	Color Selection for Truck and Bus Bodies (E)	525
Ketcham, Howard	The Selection of Color as Related to Truck and Bus Body Design (E)	525
Kishline, F. F.	A Symposium on Varnish in Engines	321
Kittler, M. J.	A Non-Icing Fully Maneuverable Aircraft Carburetor	357
Krotz, A. S.	Rubber Suspension	471
Lane, Paul S.	Bore Wear from the Viewpoint of Materials	413
Leak, A. H.	Coordinating Aircraft-Engine Design and Production	85
Lederer, Jerome	Loss Prevention in Non-Scheduled Civil Aviation	173
Lewis, O. G.; A. J. Blackwood, and C. B. Kass	Multicylinder Engine Detonation and Mixture Distribution	125
Linsenmeyer, F. J.	Heating and Air Conditioning of Automobiles (E)	310
Linsenmeyer, F. J.	Problems in Air-Conditioning Automobiles (E)	310
Lundquist, W. G.	Airline Power Control with a Torque Meter	271
Lundquist, W. G., and R. E. Johnson	The BMEP Parameter for Airplane Cruising-Power Control	97
Mathews, H. O.	The Utility and Economics of Small Passenger Cars and 1/2-Ton Trucks	335
McDonald, A. T.	Some Developments Relative to Crankcase-Oil Filtration	23
Macauley, J. B., Jr., and W. E. Zierer	Tank Mileage	29
MacCoull, Neil	Power Loss Accompanying Detonation	154
Masi, Francis	Permissible Amplitudes of Torsional Vibration in Aircraft Engines	311
Merrill, David R.; Ulric B. Bray, and C. C. Moore, Jr.	Improvements in Diesel-Engine Lubricating Oils	35
Mock, Frank C.	Prospects for Use of "Safety Fuels" in Spark-Ignition Aircraft Engines	291
Miller, F. L.	Bearing Corrosion and Lubricants (E)	290
Miller, F. L.	Minimizing Bearing Corrosion (E)	290
Moore, C. C., Jr.; David R. Merrill, and Ulric B. Bray	Improvements in Diesel-Engine Lubricating Oils	35
Mussey, D. S.; Frank Jardine, and A. H. Woollen	Light-Weight Transportation Units	526
Nebesar, Robert J.	Transatlantic Airplane Design	478
Neely, G. L.	Recent Developments in Diesel Lubricating Oils	485
Newell, Joseph S.	The Analysis of Leading-Edge Wing Beams	385
Nutt, Arthur	Aircraft Engines and Their Lubrication	501
Parker, G. H., and H. A. Hicks	Harshness in the Automobile	1
Pyne, Frederick C.	Ten Years' Service Experience with Alclad Materials in Aircraft	221
Reed, Albert C.	DC-4 Flight Tests - Their Relation to Large Air-Transport Designs	407
Rendel, T. B., and L. E. Hebl	Spark Timing - Its Relation to Road Octane Numbers and Performance	210
Roberts, E. A.	Designing the Tire for the Car	243
Robertson, A. F.; R. A. Rose, and G. C. Wilson	Duration of Combustion in a Commercial Diesel Engine	117
Rose, R. A.; G. C. Wilson, and A. F. Robertson	Duration of Combustion in a Commercial Diesel Engine	117
Rossmann, Peter F., and Don R. Berlin	Flush Riveting Considerations for Quantity Production	325
Rowley, Robert E.	Adding That Mile per Gallon (E)	356
Rowley, Robert E.	Engineered Automotive Operation and Maintenance (E)	356
Sanders, Robert	Carburetor Icing (E)	14
Sanders, Robert	Reduction of Carburetor Icing (E)	14
Spannhake, W.	Hydrodynamic Power Transmission for Motor Cars	433
Stout, William B.	What Motor Cars Can Be	229
Taub, Alex	What About the Engine?	201
Veal, C. B.	Manly, The Engineer	145
Walker, A. R.	The Role of the Diesel on Railroads (E)	477
Walker, A. R.	Use of Diesels by Railroads Continues to Grow (E)	477
Weick, Fred E.	Composite Wood and Plastic Propeller Blades	252
Wenzinger, Carl J.	Summary of NACA Investigations of High-Lift Devices	161
Wesson, C. M.	Automotive Ordnance	181
Willi, Albert B.	Engine Bearings - from Design to Maintenance	513

(E) indicates excerpt published.

AUTHOR INDEX

AUTHOR	TITLE OF PAPER	PAGE
Williams, J. G.	Engine Indication with the Cathode-Ray Oscillograph (E)	304
Williams, J. G.	The Oscillograph in Engine Indication (E)	304
Williams, Sidney J.	Benefits of Compulsory Vehicle Inspection (E)	280
Williams, Sidney J.	Compulsory Vehicle Inspection from the Safety Viewpoint (E)	280
Wilson, Ernest E., and Paul Huber	Passenger-Car Road Noise	281
Wilson, G. C.; A. F. Robertson, and R. A. Rose	Duration of Combustion in a Commercial Diesel Engine	117
Wilson, G. W.	Diesel-Electric Bus Drive (E)	58
Wolf, Austin M.	Filtering Fallacies	259
Woollen, A. H.; D. S. Mussey, and Frank Jardine	Light-Weight Transportation Units	526
Yates, B. A.	Recent Developments in Piston-Ring Materials	49
Young, Vincent C.	Aircraft-Engine Valve Mechanisms	109
Zierer, W. E., and J. B. Macauley, Jr.	Tank Mileage	29

Discusser Index

DISCUSSEER	PAGE	DISCUSSEER	PAGE	DISCUSSEER	PAGE
Abbott, Ernest J., and Samuel Bousky	288	Firestone, F. A., and P. H. Geiger	290	Livingstone, C. J.	324
Banks, F. R.	406	Fischer, William L.	319	Livingstone, C. J., and W. A. Gruse	324
Bartholomew, Earl	134; 218	Fitzsimmons, J. T.	136; 219	Masi, Francis	320
Beall, A. L.	406	Geiger, P. H., and F. A. Firestone	290	Mock, Frank C.	363
Blackwood, A. J.; C. B. Kass, and O. G. Lewis	139	Greenshields, R. J., and L. E. Hebl	138	Mount, W. S.	135
Booth, James H.	48	Gregory, A. T.	319	Norris, R. F.	288
Boulton, B. C.	333	Gruse, W. A., and C. J. Livingstone	324	Parkinson, John S.	290
Bousky, Samuel, and Ernest J. Abbott	288	Hebl, L. E., and R. J. Greenshields	138	Pavlecka, V. H.	333
Bray, Ulric B.	500	Heron, S. D.	294	Prescott, F. L.	318
Brooks, F. A.	28	Jackson, A. V.	324	Risk, T. H.	137
Campbell, John M.	139	Kanuit, Paul	294	Stanton, G. T.	288
Cole, R. A.	317	Kass, C. B.; O. G. Lewis, and A. J. Blackwood	139	Taylor, E. S.	318
Edgar, Graham	294	Lemon, B. J.	48; 251	Tuttle, J. C.	48
Eisinger, J. O.	135; 219	Lewis, O. G.; A. J. Blackwood, and C. B. Kass	139	Voorhies, Carl	76
Evans, R. D.	48			Williams, George L.	317
				Zeder, James C.	289

Subject Index

A

Accidents and Accident Prevention

BENEFITS OF COMPULSORY VEHICLE INSPECTION	(E) 280
COMPULSORY VEHICLE INSPECTION FROM THE SAFETY VIEW- POINT	(E) 280
LOSS PREVENTION IN NON-SCHEDULED CIVIL AVIATION	173
Aircraft	
Causes analyzed	176, 177, 178
Education as preventive	173, 174, 178, 179, 180
Flight testing	444
Fuel factor	291; 505, 506
High-lift devices	161
Ice formation	14
Loss prevention	173
Pilot training	173, 174, 178, 179, 180
Propellers, feathering	380, 381
Automobile	
Design factors	
Body	96
Importance of	143, 144
Streamlining	143, 144
Transmission	443
Visibility	143, 144
Preventives, importance of	280
Diesel engine, fire hazard reduced by	77
Marine, Diesel engine effects	77
Motorcoach	
Inspection, compulsory	280
Preventives, importance of	280
Motor-truck	
Inspection, compulsory	280
Preventives, importance of	280

Aero Club of America

Air Cleaners

Diesel engine use of	26, 28
Oil filter problem relation to	26, 28; 268, 269
Oil type	28; 268

Aircraft Design and Construction

AIRPLANE DRAG CAUSED BY RIVET HEADS	(E) 258
DC-4 FLIGHT TESTS—THEIR RELATION TO LARGE AIR-TRANSPORT DESIGNS	407
FLUSH RIVETING CONSIDERATIONS FOR QUANTITY PRODUCTION	325
SUMMARY OF NACA INVESTIGATIONS OF HIGH-LIFT DEVICES	161
THE ANALYSIS OF LEADING-EDGE WING BEAMS	385
THE EFFECTS OF RIVETS AND SURFACE ROUGHNESS ON WING DRAG	(E) 258
TRANSATLANTIC AIRPLANE DESIGN	478
VIBRATION CHARACTERISTICS OF AIRCRAFT ENGINE-PROPELLER SYSTEMS	540
Alclad materials	221
Aluminum used in	221
Cylinders, rotating, lift coefficient affected by	172
Engine mounting	
Aircraft structure relation to	190
Dynamic suspension	185
Vibration isolation	185
High-lift devices	
Auxiliary airfoil, fixed	163
Bibliography	163
Flaps	
Non-slotted	165, 168
Slotted	168, 171, 172
Leading-edge	163, 165
Location	161
National Advisory Committee for Aeronautics investigation	161, 172
Slot	
Fixed	163
Movable	163, 165
Tests	161
Trailing edge	165, 168, 171
Types of	161, 165, 168, 171, 172
Landing gear, tricycle type	411
Landing speed, gross weight relation to	408
Landplanes	
Characteristics chart	478

Aircraft Design and Construction (Continued)

Load		480
Performance estimates		482, 483
Seaplane compared with		478
Transatlantic requirements		478
Weight		481
Weight estimates		482
Langley airplane		
Development	147, 148, 149	
Flight tests	149, 150, 151	
Manly's contribution to	147, 148, 149	
Large air-transport design		407, 412
Lift coefficient, rotating cylinders effects		172
Makes		
Bell		509
Blenheim		509
Boeing		509
Curtiss		333; 509
Douglas		333; 407; 509
English Spitfire		509
Lockheed		509
Nacelle, design trends		510
Pressure cabins		412
Production		
Flush riveting		
Appearance factor		325
Brazier riveting compared with	326, 327, 329, 332	
Cost factor	325, 326, 329, 331, 332	
Data on		332, 333
Dimpling		333, 334
Importance		325, 333
Inspection		331, 332
Research program		325, 333
Techniques compared		333
Test methods		329
Tool development	329, 330, 331, 333	
Tooling, experimental		328
Types of flush rivets		326, 333
Magnaflux testing		59, 68
Mass production		325
Riveting, flush		325
Propellers		
COMPOSITE WOOD AND PLASTIC PROPELLER BLADES		252
FEATHERING PROPELLERS IN AIRLINE TRANSPORT OPERATION		372
Blades		
Compreg used in		252, 253
Construction		252, 253, 254
Materials used	252, 253, 254, 255	
Plastic-and-wood	252, 253, 254, 255	
Schwarz type		
Construction methods	252, 253, 254	
Flutter		257
Ice formation prevented		258
Materials	252, 253, 254, 255	
Progress		258
Reliability		257
Repairing		258
Strength		257
Vibration		257
Wood-and-plastic	252, 253, 254, 255	
Co-axial		506
Constant-speed		
Control		373, 377
Merits		372
Electric		373, 379
Feathering		
Control methods		373, 379
Governors	373, 375, 378	
Hydraulic control		378, 379
Hydromatic	373, 374, 375, 376, 377, 378, 379, 380, 382, 383	
Merits		384
Research needed		384
Types of		373
Hydraulic	373, 379	
Makes, Hamilton		540
Root sections		257
Size trends		548
Testing		540
Unbalance		544
Weight reduction needed		255

SUBJECT INDEX

	PAGE		PAGE
Aircraft Design and Construction (Concluded)		Aircraft Operation and Performance (Concluded)	
Reynolds number, lift affected by	161, 163, 172	Landing speed, gross weight relation to	408
Seaplanes		Makes	
Characteristics chart	479	Boeing	446
Landplane compared with	478	Douglas	407
Load	480	Yankee Clipper	447
Transatlantic requirements	478	Operating efficiency	
Weight	481	Engine torque meter to increase	272, 273
Testing		Factors involved	272
High-lift devices	161	Technique	101
Magnaflux	59, 68	Pressure cabins	412
National Advisory Committee for Aeronautics	161, 172	Progress	97
Propellers	540	Propellers	
Wind tunnel	161	FEATHERING PROPELLERS IN AIRLINE TRANSPORT OPERATION	372
Vibration insulation	103	Efficiency, factors affecting	254, 255, 256
Weight, gross	408	Failure, types of	317
Wings		Feathering	
Beams, leading-edge		De-icers	381, 382
Analysis of	385, 386, 387, 388	Icing problem	381, 382
Calculations	385, 386, 387, 388	Need for	372
Boundary layer control	172	Operation of	373
High-lift devices	161, 172	Performance figures	380
Low-aspect ratio	171	Safety factor	380, 381
Rivet heads, drag affected by	258	Testing	255
Shear center, location of	387	Vibration	
Stresses, shear	386, 387, 388	Blade effects	319; 546
(See also Accidents and Accident Prevention, Aircraft; Aircraft Operation and Performance; Aviation; Engines, Aircraft; and Production, Aircraft)		Damping	546, 547
		Engine effects	317, 318, 320; 541, 548
		Engine isolation as remedy	548
		Failures caused by	540
		Frequencies	542, 546
		Resonance	546
		Strain gage used to measure	540, 541
		Stresses	541, 544
		Tip interference	546
		Weight affected by	548
		Safety, high-lift devices	161
		Speed	
		Landing	408, 409
		Level	409
		Take-off	
		Calculations	484
		Factors affecting	484
		Safety performance	410
		Testing	
		Flight	410; 444
		Propellers	255
		Transatlantic	
		Operation cost estimates	484
		Performance estimates	482, 483
		Vibration	
		Engine effects	541
		Engine isolation as remedy	548
		Engine mounting effects	546
		Forms of	541, 543, 546
		Propeller	544
		Reduction means	547, 548
		Wing drag	
		Reduction means	258
		Rivet-head effects	258
		(See also Accidents and Accident Prevention, Aircraft; Aircraft Design and Construction; Aviation; Engines, Aircraft; and Production, Aircraft)	
Aircraft Operation and Performance		Aluminum and Aluminum Alloys	
AIRLINE POWER CONTROL WITH A TORQUE METER	271	LIGHT-WEIGHT TRANSPORTATION UNITS	526
AIRPLANE DRAG CAUSED BY RIVET HEADS	(E) 258	TEN YEARS' SERVICE EXPERIENCE WITH ALCLAD MATERIALS	
DC-4 FLIGHT TESTS—THEIR RELATION TO LARGE AIR-TRANSPORT DESIGNS	407	IN AIRCRAFT	221
THE BMEP PARAMETER FOR AIRPLANE CRUISING-POWER CONTROL	97	Aircraft use of	221
THE EFFECTS OF RIVETS AND SURFACE ROUGHNESS ON WING DRAG	(E) 258	Alclad	
THE TESTING OF LARGE AIRCRAFT	444	Appearance factor	226
VIBRATION CHARACTERISTICS OF AIRCRAFT ENGINE-PROPELLER SYSTEMS	540	Coating	221, 222, 228
Climb performance	409	Core	221, 222
Cost factor	97	Corrosion resistance	222, 223, 225
Cruising flight		Data on	221, 228
Airplane efficiency relation to	99, 100	Diffusion zone	221, 222, 227
Definition	97	Electrolytic protection	222
Engine efficiency relation to	99, 100	History	221, 225
Power control		Merits	221, 228
Torque meter usage	275	Properties, mechanical	226, 228
Types of	275	Quenching	227, 228
Propeller efficiency relation to	99, 100	Scratches	226
Requirements	97	Specifications	228
Types	101	Tests	223, 225, 226
Drag		Alumilite treatment	531
Engine effects	509		
Wing	258		
Engine selection factor	103		
Flight, cruising	97, 99, 100, 101; 274, 275		
Flight regime	101, 102		
Flight tests			
Cost factor	410; 444		
Description of	408		
Economics, importance of	444		
Factors involved	444, 448		
Functional systems	447, 448		
Instrument calibration	448		
Minimum-hazard policy	444, 446, 447, 448, 456		
Performance results	409, 410		
Personnel			
Co-pilot	445		
Flight engineer	445		
Flight recorder	445		
Pilot	445		
Training	446		
Planning technique	448		
Preparation for	407		
Problems	456		
Size factor	444		
Torque meter used in	456		
Ice removal			
De-icers	381, 382		
Research needed	384		
Rotoscope study of	383		
Landing safety	411, 412		

S.A.E. TRANSACTIONS

	PAGE		PAGE
Aluminum and Aluminum Alloys (Concluded)		Automobile Design and Construction (Concluded)	
Body use		Chevrolet	324, 340; 457, 458, 461, 463, 464, 465, 466, 467, 468, 469, 470
Motorcoach	528, 529	Chrysler	457, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470; 504
Motor-truck	527	Citroen	350; 368
Weight reduction	526, 527, 532	Cord	368
Cost factor	533, 534	DeSoto	464, 468, 469, 470
Engine use, motorcoach	531	Dodge	464, 465, 468, 469, 470
Extrusions	529, 530, 531	Ford	339, 340; 461, 462, 463, 464, 466, 467, 468, 469, 470
Fabrication methods	530	Hudson	458, 461, 463, 464, 465, 466, 467, 468, 469, 470
Motorcoach		LaSalle	457, 458, 461, 463, 465, 466, 467, 468, 469, 470
Body use	528, 529	Lincoln	461, 462, 465, 467, 469, 470
Engine use	531	Mercury	461, 463, 466, 468, 469, 470
Weight reduction	526, 527	Nash	462, 463, 465, 466, 467, 468, 470
Motor-truck		Oldsmobile	457, 461, 462, 463, 464, 465, 466, 467, 468, 469; 538
Body use	527	Opel	537, 538
Weight reduction	526, 527, 533	Packard	457, 461, 464, 465, 466, 467, 468, 470
Railcar use	531, 532	Plymouth	340, 341; 461, 462, 464, 468, 469, 470
Rear axle use	531	Pontiac	457, 458, 462, 463, 464, 466, 467, 468, 469, 470
Specifications	530	Regal	366
Steel compared with	526, 529, 532, 533	Renault	270
Wheel use	531	Scarab	232, 234; 369
American Society for Testing Materials	225; 414, 449	Studebaker	461, 463, 464, 465, 467, 469, 470
American Society of Heating and Ventilating Engineers	310	Vauxhall	536, 537
American Standards Association	153	Willys	457, 461, 462, 463, 464, 465, 466, 467, 469, 470
Army		Materials	
AUTOMOTIVE ORDNANCE	181	Car design affected by	141, 142, 144
Air Corps	59; 504	Modulus of elasticity, importance of	141, 142
Industry's cooperation	181, 184	Other vehicle types compared with	229
Ordnance Department	181	Present-day design analyzed	142, 143
Ordnance expenditures, automotive and total compared	182	Progress	142; 350; 457
Ordnance mechanization		Propeller shafts, progress	464
Progress	183, 184, 192	Rear-engine effects	231, 234
Requirements	184, 192	Rigidity, structural	
Tank development	181, 182, 183, 184	Body contribution to	5
War procurement	184, 192	Deflection characteristics tested	4, 5, 6
Quartermaster Corps	181	Frame contribution to	5
S.A.E. cooperation	192	Increase in	3, 4
Tank progress	181, 182, 183, 184	Riding qualities affected by	3, 4
		Testing	4, 5
		Rubber used in	471
		Stability, directional	143
		Streamlining	142, 143, 144; 350
		Style effects	142, 143, 144
		Tire selection	243
		Trends	457
		Weight	
		Distribution	142, 143; 234
		Future predicted	144
		Ratio of sprung to unsprung	7
		Reduction needed	350
		Three-thousand-pound car, merits of	144
		Trends	457
		Wheelbases	457
		Windshields	144
		(See also Accidents and Accident Prevention, Automobile; Automobile Operation and Performance; Axles; Bodies; Brakes; Clutches; Engine Design and Construction; Foreign Design and Operation; Frames; Gears; Production; Riding-Qualities; Springs, Suspension; Steering Systems; Tires and Rims; Transmissions; and Wheels)	
Automobile Design and Construction		Automobile Operation and Performance	
EUROPEAN STREAMLINING SLASHES AIR RESISTANCE	(E) 350	EUROPEAN STREAMLINING SLASHES AIR RESISTANCE	(E) 350
HARSHNESS IN THE AUTOMOBILE	1	MODERN EUROPEAN LIGHT CARS	(E) 350
MODERN EUROPEAN LIGHT CARS	(E) 350	Cars used in fleet operation	335, 341
THE CAR OF THE FUTURE	141	Cost factor	144
TRENDS IN DESIGN OF 1940 CARS	457	Design effects	143
WHAT MOTOR CARS CAN BE	229	Directional stability	143
Aluminum used in	527	Driver	
Appearance		Tank mileage affected by	34
Changes in	142	Vibration effects on	1
Safety factor	143	Economy of operation	144
Sales factor	143	Lateral resistance	143
Streamlining	142	Noise	
Body and frame unit construction	229, 231	PASSENGER-CAR ROAD NOISE	281
Bumpers	468	Absorption materials	286, 287, 288, 289, 290
Cost factor	144	Body	281, 286, 287, 289
Design improvements listed	340	Criteria	
Development	229, 230	Decibel scale	282, 283, 287, 288, 289
Dimensions, changes in	142	Ear	288
Direction signals	457, 467	Engine	281, 286
Directional stability	143	Measurement	281, 288, 289
Engine mounting, rear	142, 143; 234	Noise pattern effect	286
Equipment	467, 468	Problem stated	281
Frameless cars	535		
Fuel			
Car design affected by	141		
Future predicted	141		
Future predicted	141, 144, 153; 229, 233, 234		
Height			
Safety factor	143		
Trend	143		
History	142		
Hood locks	468		
Human nature, influence of	141, 144		
Improvements needed	234; 350		
Locks	468		
Makes			
Adler	368		
Bantam	468		
Buick	457, 458, 461, 462, 464, 465, 466, 467, 468, 469, 470; 525		
Burney	142		
Cadillac	457, 461, 463, 464, 465, 466, 467, 468, 469, 470		
Chalmers	366		

SUBJECT INDEX

[illegible]

S.A.E. TRANSACTIONS

	PAGE		PAGE
Bodies (Concluded)		Carburetors and Carburetion (Concluded)	
Frame unit construction with	229, 231	Design, new	
Future predicted	229, 234; 367, 368, 369, 370, 371, 384	Conventional type compared with	363
Heating	232; 468	Description	358, 359, 360, 361
History	365, 366, 371	Icing characteristics	361, 362
Materials used in	369	Maneuverability	362
Motorcoach		Metering characteristics	362, 363
Aluminum used in	528, 529	Diaphragm mechanism	359, 360, 362, 364
Appearance, color	525	Down-draft type	358
Chassisless	527	Fuel-boiling problem	363, 364
Engine location effects	527	Ice formation	
Loads		Air preheating as preventive	14
Distribution	527	Causes	357, 358
Dynamic	528, 529	Prevention of	361, 362
Static	528	Preventives suggested	14
Stresses		Idle adjustment	360, 361
Calculated	528	Load compensation	364
Compressive	528	Maneuverability	358, 362, 364
Dynamic	529	Power compensator	360, 361
Measured	528, 529	Makes	
Static	528, 529	Amal	13
Strain-gage used to measure	528, 529	Carter	459, 460
Tensile	528	Holley	357
Testing	528	Zenith	460
Types classified	527	Progress	458, 460
Weight reduction		Civil Aeronautics Authority	173
Aluminum used for	526, 527, 532		
Frameless design	536	Clutches	
Motor-truck		Facing area	461
Aluminum used in	527, 533	Makes, Atwood	461
Appearance		Progress	461
Color	525	Semi-centrifugal	461
Lettering	525		
Noise	368	Commercial Cars	
Plastics used in	369, 370; 470; 525	(See Fleet Operation, Motorcoach and Motor-Truck)	
Progress	365, 366, 369		
Rigidity increase	3	Cooperative Fuel Research	
Rubber used in	93; 470	Detonation testing	
Running boards	143, 144; 229, 231, 234; 457, 468, 470	CFR RESEARCH METHOD OF TESTS FOR KNOCK CHARACTERISTICS OF MOTOR FUELS	277
Seats		THE PRECISION OF KNOCK RATING - 1936-1938	449
Air conditioning	95, 96	Engine, C.F.R.	277, 279
Cushions	93; 468, 469, 470	Laboratory tests	277; 449
Location	457	Participation in	449
Safety features	96	Exchange Group	449
Space saving	96	Motor Fuels Section	449
Ventilation	95, 96		
Soundproofing	470	Corrosion and Corrosion Prevention	
Space requirements	232	Aluminum	
Steel	142; 536, 537	Alclad	221, 228
Streamlining	143; 370, 371	Tests	223, 225, 226
Structural design	367, 368	Bearings	290
Styling	366, 367, 368, 370	Causes analyzed	49
"Torpedo" illustrated	469	Reduction means	49
Trends	229, 230, 234; 366, 367, 368, 369, 371; 468, 469, 470		
Upholstery	370; 470	Crankshafts	
Ventilation	232; 468	PERMISSIBLE AMPLITUDES OF TORSIONAL VIBRATION IN AIRCRAFT ENGINES	311
Windows	144; 469	Aircraft engine	
Window sash	531	Radial engine	
Windshields	469	Torque harmonics	542, 543
Windshield wipers, criticism of	232	Vibration	541, 544, 545
		Stresses	311
		Vibration	311, 312, 313, 314, 315, 316, 317, 318, 319, 320; 502, 503, 541, 543, 544, 545
		Progress	459
		Ventilation	459
		Vibration	
		Aircraft engine	
		Amplitudes, permissible	
		Definition proposed	319
		Factors involved	311, 317
		Importance of establishing	311, 318
		Methods of determining	311, 312
		Damping, dynamic	502, 503
		Forms of	541, 543, 546
		Frequencies	314, 315, 318; 541
		Improvements cited	502, 503
		Limits	
		Crankshaft deflection as basis of	312, 313, 314, 318, 319, 320
		Fixed restriction	311, 312, 318, 319, 320
		Propeller vibration relation to	317, 318, 320
Brakes			
Braking, rear-engine effects	229, 234		
Drum material	464; 534		
Hydraulic	464		
Progress	464		
Size	464		
Bus			
(See Motorcoach)			
C			
Carburetors and Carburetion			
A NON-ICING FULLY MANEUVERABLE AIRCRAFT CARBURETOR	357		
REDUCTION OF CARBURETOR ICING	(E) 14		
Aircraft			
Accelerating pump	361		
Air-fuel mixture ratio			
Mixture control	360, 361, 364		
Regulating, method of	359, 360		
Requirements	358		
Altitude compensation	364		

SUBJECT INDEX

	PAGE
Crankshafts (Concluded)	
Stress calculation	314, 315, 316, 319
Stresses, secondary	320
Stress-range diagrams	316
Test-stand effects	319, 320
Twist test	311, 312, 318, 319, 320
Weight factor	317
Dampers	
Dynamic	502, 503
Improvements due to	502, 503
History	541
Modes of	541, 542, 543

Cylinders

Air-cooled, merits	391
Aluminum	533, 534
Combustion chamber design	
Fuel consumption affected by	203
Shape, effect of	203
Volume distribution	206, 207, 208
Heads	
Fuel swirl effects	391, 406
Hemispherical	391
Liner materials	419
Sleeve materials	420
Wear	
Causes analyzed	49
Finish as preventive	50
Metal effects	419, 420
Temperature effects	493

D

Delivery Cars

(See Motor-Trucks)

Detonation

MULTICYLINDER ENGINE DETONATION AND MIXTURE	
Distribution	125
POWER LOSS ACCOMPANYING DETONATION	154
SPARK TIMING—ITS RELATION TO ROAD OCTANE NUMBERS	
AND PERFORMANCE	210
Atmospheric temperature effects	217
Bomb and engine compared	425
Bouncing pin adjustment	278
Combustion roughness a separate entity	209
Economic phase	139, 140
Engine affected by	
Fuel economy	237
Power	240, 241, 242
Engine factors	
Air-fuel mixture distribution	126, 127, 128, 133, 134, 139
Air-fuel mixture ratio	125, 130, 133; 237, 238
Air-fuel mixture temperature	237, 238
Carbon deposits	218, 219
Compression ratio	154, 155, 156, 159, 160; 217, 218, 220; 237, 238, 278
Cooling	154, 157, 158, 159
Cooperative Fuel Research engine	277, 279
Cylinder head design	160
Cylinder operating temperatures	237, 239
Data on	127
Ignition	
Preignition	154, 155, 158, 159, 160
Spark advance	154, 155, 156, 158, 159, 160
Spark plug temperature	157, 158, 160
Spark retarding	154, 156
Timing	129, 130, 132, 133, 134, 138, 139; 154, 160; 210, 211, 212; 237, 238, 240
Mean effective pressure	237, 238
Severity factor	216, 219, 220
Speed	159, 160; 216
Temperature	154, 156, 157, 159, 160
Engine manufacturer cooperation needed	134
Fuel factors	
Antiknock value	160
Cracking	215, 220
Fuel type effects	215; 450, 451, 456
Heptane, normal	280
Iso-octane	280
Octane number	125, 130, 131, 133, 135, 136, 137; 154, 156, 158, 160; 210; 237, 242, 277, 279; 449, 450, 455, 456
Sensitivity factor	220
Types used	159
Volatility	127, 128, 130, 133, 139

Detonation (Concluded)

Knock, borderline	213, 214
Knocking tendency in individual cylinders	130
Multicylinder problem	125
Research	
Progress	210, 218
Suggested	210, 218
Suppression means	238, 239, 240, 241, 242, 251
Testing	
CFR RESEARCH METHOD OF TESTS FOR KNOCK CHARACTERISTICS OF MOTOR FUELS	277
THE PRECISION OF KNOCK RATING—1936-1938	449
Auxiliary sampling valve	423
Bouncing pin	422, 452
Cathode-ray oscillograph used	135, 139
Cooperative Fuel Research method	277; 449
Knock characteristics	277
Knock intensity, standard	278
Knock rating	449
Laboratory, Cooperative Fuel Research	
Accuracy	449, 450
Air condition effects	454, 456
Apparatus	277, 279, 280
Compression ratio, octane number relation to	455
Conclusions	456
Correlation coefficients	452, 453
Engine carbon effects	454
Fuel type effects	450, 451, 456
Humidity effects	454, 456
Knock rating	449
Methods compared	451, 456
Octane number	277, 279; 449, 450, 455, 456
Operating conditions	277
Precision	
Factors affecting	452
Fuel type relation to	450, 451
Maximum attainable	451
Procedure	278
Reference fuels	277, 279
Results	449
Scope	277; 449
Multicylinder engine	125, 126, 135
Power loss	
Car tests	154
CFR single-cylinder engine used	155
Results summarized	154, 160
Test method described	154
Reference fuels	132, 139
Spark timing	210
Test engine described	130, 131
Test results	422
Windows used	424

E

Electric Drive

DIESEL-ELECTRIC BUS DRIVE	(E) 58
Diesel engine used with	58
Merits	58
Motorcoach use of	58
Progress	58
Usage extent	58

Engine Design and Construction

WHAT ABOUT THE ENGINE?	201
WHAT MOTOR CARS CAN BE	229
Aircraft engine compared with	233
Balance	
Dynamic	458
Progress	457
Compression ratio	
Fuel consumption affected by	204
Trends	458, 459
Cooling	
Air cooling	
Merits	233
Water-cooling compared with	233
Progress	459
Water cooling, air cooling compared with	233
Crankcases, aluminum	533, 534
Cylinder types	
Number of cylinders	201
Trends	202
Exhaust system	
Mufflers	460
Progress	460

S.A.E. TRANSACTIONS

Engine Design and Construction (Concluded)	PAGE	Engine Operation and Performance (Concluded)	PAGE
Front-wheel drive	201	Ignition effects	
Fuel supply system, pump progress	460	Spark plug gap	203
Future predicted	229	Spark plug, long reach vs. normal	204
Improvement needed	201	Timing	211, 212
Lubricating systems, trends	459	Lean mixtures	203
Maintenance, accessibility needed	202	Mixture distribution effects	203
Makes		Progress, British	203
Bantam	458, 459, 460, 461	Reduction needed	203
Buick	205; 458, 459, 460, 461	Road-load economy	
Cadillac	460	Calculation of	30
Chevrolet	459, 460	Factors affecting	29, 30, 31, 32, 33
Chrysler	458, 459	Road test data	31
Citroen	201	Streamlining effects	30, 31
DeSoto	458, 459	Taxation effect on	203
Ford	459	Testing	31
Franklin	233	Transmission effects	
Hudson	458, 459, 460	Overdrive	32
LaSalle	458, 459, 460	Semi-automatic	32
Lincoln	458, 459, 460	Vehicle speed effects	31, 34
Oldsmobile	458	Vehicle weight effects	33
Packard	458, 459	Wind resistance effects	30, 31
Plymouth	459	Lubrication	
Pontiac	458, 459, 460, 461	Carbon formation	322
Vauxhall	201, 203, 204, 209	Compound merits	499
Willys	458, 459, 460	Diesel engine oil used	
Mounting		Data on	499
Noise reduction through	286, 288	Octane requirements affected by	500
Progress	461	Engine deposits	322
Rear		Lacquer formation	323, 324, 334
Body design related to	369	Oil deterioration	334
Bounce control affected by	229, 234	Oil filters	
Braking affected by	229, 234	Fallacies regarding	259
Future predicted	201; 229; 369	Merits	259
Merits	231	Oil type effects	323, 324, 334
Ride affected by	229, 231, 234	Sludge formation, varnish	321, 324
Traction affected by	229, 234	Testing	324
Rubber	286, 288; 461	Varnish	
Power, trends	458	Causes analyzed	322, 323, 324, 334
Progress	233; 458, 459, 460	Data on	322, 323, 324
Styling effects	201, 202	Definition	321
Trends	203; 458, 459, 460	Oil type relation to	323, 324, 334
(See also Air Cleaners; Bearings; Carburetors and Carburetion; Crank-		Oxidation inhibitors as preventive	334
shafts; Cylinders; Detonation; Engine Operation and Perform-		Temperature effects	322, 323
ance; Engines, Aircraft; Engines, Diesel; Engines, Motor-		Troubles due to	321, 322, 324, 334
coach; Engines, Motor-Truck; Foreign Design and Opera-		Noise	281, 286
tion; Fuels; Gasoline; Ignition; Induction; Oil Filters; Pis-		Oil filters, use of	259
tons; and Valves and Valve Gear)		Power	
Engine Operation and Performance		Detonation effects	154
ADDING THAT MILE PER GALLON	(E) 356	Fuel type effects	214, 215, 217
A SYMPOSIUM ON VARNISH IN ENGINES	321	Loss	154; 214, 215, 217
ENGINEERED AUTOMOTIVE OPERATION AND MAINTENANCE	(E) 356	Spark timing effects	211
ENGINE FLAME RESEARCHES	421	Throttling effects	212
TANK MILEAGE	29	Trends	323
WHAT ABOUT THE ENGINE?	201	Road test data	31
Combustion		Roughness	
Flame movement	423, 431	Detonation a separate entity	209
Flame temperature measurements	427, 429	Plaster-cast method of forecasting	205, 206, 207, 208
Knock-free	424, 427, 431	Tank-mileage	
Mass burned, volume inflamed relation to	431	Climatic effects	33
Pressure-time cards	422	Cross-country driving	34
Pressure-volume cards	422	Data on	34
Pressure waves	425	Driver effects	34
Radiation characteristics	426	Streamlining effects	30, 31
Rate of combustion, factors affecting	432	Throttle stop effects	34
Research	421	Traffic operation effects	33, 34
Testing		Vehicle speed effects	31, 34
Indicators used	421	Wind resistance effects	30, 31
Photographic methods	424, 425, 428, 429	Testing	
Spectroscopic studies	426, 427	Fuel consumption	31
Windows used	424, 427	Lubrication	324
Volume inflamed, mass burned relation to	431	Road-load economy	31
Window observations	424	Tank mileage	33, 34
Cooling		Throttling	212
Air vs. water	143	Wear	
Airplane and automobile compared	143	BORE WEAR FROM THE VIEWPOINT OF MATERIALS	413
Water vs. air	143	Bore structure relation to	414, 415
Fuel consumption		Cylinder material effects	419, 420
Chassis friction effects	31	Data on	414, 415, 417, 418, 419, 420
Combustion chamber design effects	203	Piston-ring material effects	415, 416, 417
Compression ratio effects	204	(See also Air Cleaners; Bearings; Carburetors and Carburetion; Crank-	
Factors affecting	29, 30, 31, 32, 33; 356	shafts; Cylinders; Detonation; Engine Design and Construc-	
Gear ratio effects	31, 32	tion; Engines, Aircraft; Engines, Diesel; Engines, Motorcoach;	

SUBJECT INDEX

	PAGE		PAGE
Engineers and Engineering		Engines, Aircraft (Continued)	
MANLY, THE ENGINEER	145	Flat type	509
Body engineer	365, 367, 368	Foreign and domestic engines compared	512
Langley, S. P.		Fuel consumption	
Aircraft pioneering	147	"Best economy"	98, 101, 103
Langley Medal	147	Compression ratio effects	235, 236, 242
Manly, association with	147	Data on	98; 411
Manly, Charles Matthews		Detonation, limitations imposed by	237
Airplane-engine development	145	Direct injection effects	400
Biography	145	Economy possibilities for ideal conditions	235, 236, 237
Flight tests described	149, 150, 151	Exhaust back pressure effects	235, 236
Hydraulic drive	150, 151	Factors affecting	235, 236, 242
Langley airplane, work on	147	Mean effective pressure effects	235, 236
Langley, association with	147	Mechanical efficiency effects	235, 236
Manly Drive	150, 151	Power relation to	98
S.A.E. activity	152, 153	Reduction means outlined	242, 251
War work	152	Spark advance setting effects	235, 236, 242
Work with Langley summarized	148, 149	Testing	404
Youth	148	Fuel feeding	
Engines, Aircraft		Direct injection	
AIRCRAFT-ENGINE LUBRICATION	8	Advantages	393, 401
AIRCRAFT ENGINES AND THEIR LUBRICATION	501	Cylinder injection	291, 292, 293
AIRLINE POWER CONTROL WITH A TORQUE METER	271	Fuel consumption decreased by	400
AVIATION FUELS AND ENGINES	389	German practice	400
COORDINATING AIRCRAFT-ENGINE DESIGN AND PRODUCTION	85	Injection equipment	292, 293
DYNAMIC SUSPENSION—A METHOD OF AIRCRAFT-ENGINE MOUNTING	185	Intake-pipe injection	292, 293
FUEL-ECONOMY POSSIBILITIES OF OTTO-CYCLE AIRCRAFT ENGINES	235	Merits	294
PERMISSIBLE AMPLITUDES OF TORSIONAL VIBRATION IN AIRCRAFT ENGINES	311	Supercharger injection	291, 293
PROGRESS IN THE DEVELOPMENT OF IN-LINE AIR-COOLED ENGINES	(E) 548	Fuel injection trends	506
THE BMEP PARAMETER FOR AIRPLANE CRUISING-POWER CONTROL	97	Future predicted	506
VIBRATION CHARACTERISTICS OF AIRCRAFT ENGINE-PROPELLER SYSTEMS	540	Future predicted	401, 402, 403; 502, 507, 508, 512
Altitude effects, power	505	Improvement, factors contributing to	501
Automobile engine compared with	233	Lubrication	
Brake mean effective pressure		Carbon formation	9, 10, 11
Control		Corrosion	8, 10
Factors affecting	103	Detonation relation to	8, 9, 13
Indicated air speed	101, 102	Improvement, need for	511
Manifold pressure	101, 102	Mechanical conditions, effect of	9, 10
Torque-meter	101, 102	Mixture relation to	8, 9
Types of	101, 102	Oil filters, use of	269, 270
Definition	99	Oil oxidation	511, 512
Trends	501	Oil properties	
Cooling		Compound	511
Air		Requirements	8; 511
Automobile engine compared with	143	Testing	8, 9, 13, 14
Drag affected by	509, 510	Viscosity	511
Liquid cooling compared with	506, 508	Oil temperature, oil viscosity relation to	511
Cooling area	502	Problem analyzed	8
Fin design	502	Progress	511
Liquid		Ring sticking	8, 9, 13, 14
Air cooling compared with	506, 508	Sludge formation	8, 12, 13
Disadvantages	508, 509	Testing	8, 9, 13, 14; 511
Drag affected by	509	Viscosity	
Future predicted	512	Film strength relation to	511
Merits	508, 509	Temperature relation to	511
Military use	508, 509, 512	Makes	
Power effects	508	Allison	506
Progress	502	Armstrong-Siddeley	390
Research	502	Bristol	9, 14; 390; 506
Reverse flow	509, 510	Hispano Suiza	506
Trends	510	J. A. P.	9, 12, 13, 14
Cowling	501	Junkers	505, 506
Cylinder types, in-line		Lawrence	504
Air cooled	548	Liberty	146
Merits	548	Mercedes-Benz	506
Progress	548	Napier	390, 404, 405; 506
Diesel		Norton	14
Altitude effects, power	505	Ranger	548
Foreign use of	77, 78, 84	Rolls-Royce	390, 400, 402; 506
Gasoline engine compared with	403; 505, 506	Wright	187; 501, 502, 503, 505, 506
German developments	505, 506	Manly engine	
Merits	403	Aerodrome A	146
Payload	505	Design	146, 147
Pressures, peak	505	History	145, 146
Weight	505	Langley Medal bestowed	147
Drag, cooling type effects	509	Materials	
Efficiency, mechanical	99; 235, 236, 240	Progress	504
Efficiency, thermal	99, 100; 235, 236	Requirements	504
		Military	507, 508, 509, 512
		Mounting	
		Dynamic suspension	
		Aircraft structure effect	190
		Center-of-gravity overhang effect	190
		Design features	187, 188
		Directional spring restraint	186
		Example analysis	191, 192
		"Floating power" comparison	185; 504

S.A.E. TRANSACTIONS

	PAGE		PAGE
Engines, Aircraft (Continued)		Engines, Aircraft (Concluded)	
Principle stated	185, 504	Propeller vibration relation to	317, 318, 320; 540
Propeller gyroscopic effect	190	Torque harmonics	542, 543
Reduction-gear torsional effect	190	Wear, testing	418, 419
Rubber used in	188	Weight	501, 505
Vibration isolation	185, 186	(See also Carburetors and Carburetion; Crankshafts; Cylinders; Detonation; Fuels; Gasoline; Ignition; Induction; Pistons; Superchargers and Supercharging; and Valves and Valve Gear)	
Rubber used in	188		
Types described	187		
Vibration affected by	504		
Oil filters, use of	269, 270		
Operating requirements outlined	235		
Operation		Engines, Diesel	
Brake-mean-effective-pressure relation to	99	DIESEL-ENGINE INSTALLATION IN COACHES AND TRUCKS	305
Cruising manifold pressure effects	97, 98	DURATION OF COMBUSTION IN A COMMERCIAL DIESEL ENGINE	117
Cruising power effects	97, 98	RECENT EUROPEAN DEVELOPMENTS IN HIGH-SPEED DIESEL ENGINES	77
Cruising r.p.m. effects	97, 98	THE ROLE OF THE DIESEL ON RAILROADS	(E) 477
Otto-cycle, fuel-economy possibilities of	235	USE OF DIESELS BY RAILROADS CONTINUES TO GROW	(E) 477
Payload	505	Combustion	
Performance data	297	After-burning	119, 122, 140
Poppet vs. sleeve valves	510	Duration	
Power		Curves	121, 122
Altitude effects	505	Fuel feeding effects	122, 123
"Best power"	98	Ignition lag relation to	122
Cruising-power control		Testing	117
BMEP parameter	97, 99, 101, 103	Fuel type effects	122, 140
Factors affecting	97, 98, 103	Ignition lag	
Importance of	97	Combustion duration relation to	122
Parameter, BMEP	97, 99, 101, 103	Curves	120, 122
Types described	97	Definition	119
Fuel consumption relation to	98	Fuel feeding effects	120, 122
Torque meter used to control	271, 275	Fuel type effects	123
Trends	501, 511, 548	Reduction	123
Predictions		Testing	117
Fallibility of	501	Variation	119
Use	501	Noise increase	123
Production		Original burning	119
Coordination, design and production		Testing	
Changes		Apparatus described	117
Decision regarding	89, 90	Conditions maintained	118, 119
Factors involved	89, 90	Photo-electric combustion indicator	117
Number of	89	Procedure	119
Sources of	89	Results	119, 120
Cooperation between production and engineering	88, 89, 90	Turbulence effects	120
Cost factor	85	Combustion chamber types, foreign usage	77, 78, 79, 80, 81, 83
Design and test programs	85, 86	Control, remote	78
Developed units, utilization of	90	Designs described, foreign	78, 79, 80, 81, 83, 84
Factors involved	85, 92	Foreign use of	77, 84
Finish control	91	Four vs. two stroke cycle	77, 78
Materials		Fuel feeding	
Hardness	92	Injection timing	80
Selection	91, 92	Nozzles	78, 80, 83
Objective	85	Pumps, progress	82, 84
Quality control	91	Gasoline engine compared with	305, 308; 403; 505, 506
Standardization factor	86, 87, 88	Lubrication	
Cost reduction	85	IMPROVEMENTS IN DIESEL-ENGINE LUBRICATING OILS	35
Progress	501, 512	RECENT DEVELOPMENTS IN DIESEL LUBRICATING OILS	485
Reliability	297	SOME DEVELOPMENTS RELATIVE TO CRANKCASE-OIL FILTRATION	23
Sleeve vs. poppet valves	510	Breaking-in	494, 495
Specifications, British	390	Compound oils	
Speed, trends	501	Bearing failure	486
Submerged installations	509	Cost factor	498
Testing		Engine purging	498, 499, 500
Fuel consumption	404	Limiting adhesion temperature	492, 500
Lubrication	8, 9, 13, 14; 511	Merits	498, 500
Wear	418, 419	Mineral oil compared with	485, 486, 500
Torque meter		Need for	485
Advantages	272, 273, 275, 276	Ring sticking	486, 487, 488, 500
Brake horsepower controlled by	273	Temperature effects	492
Fuel-air ratio controlled by	273	Testing procedures	486, 487
Problems involved in use of	276	Test oils	487
Types of	271	Corrosion	24, 27, 42
Trends	501	Difficulties	35
Types, variety needed	509, 512	Engine deposits	23, 27
Valve mechanisms	109	Lacquer formation	24, 28, 36
Vibration		Oil change period	497, 498, 500
Amplitudes, permissible		Oil deterioration	23, 26, 27
Importance of establishing	311	Oil filtration	24, 25, 26, 27, 28
Methods of determining	311, 312	Oil properties	
Damping, dynamic	502, 503	Compound	
Frequencies	189, 191	Additives, soap-type	35, 42
Improvements cited	502, 503	Merits	23, 35
Mounting effects	185, 191; 504	Mineral compared with	23, 24, 35, 42
Natural frequency		Oil filter effects	25
Calculations	189	Soap-type additives	35, 42
Placement	191	Improvements obtained	23, 35

SUBJECT INDEX

	PAGE		PAGE
Engines, Diesel (Concluded)		Engines, Motorcoach (Concluded)	
Requirements		Engine suspension	
Carbon-forming tendency, low	42	Flexible installation	306, 307
Detergency	35, 36, 37, 38, 42	Moment of inertia, determination of	306, 307
Film strength	38, 39, 42	Principal axis	306
Oiliness	40, 41, 42	Problem analyzed	305, 306
Stability	42	Exhaust system	308, 309
Viscosity	27	Fuel system	308
Ring sticking	23, 28, 35, 36	Noise	308
Scuffing	36	Mounting, rear	229
Temperature effects	24, 27		
Test data	37, 41	Engines, Motor-Truck	
Wear	36, 40, 41; 492, 493	DIESEL-ENGINE INSTALLATION IN COACHES AND TRUCKS	305
Makes		WHY NOT 125 BMEP IN AN L-HEAD TRUCK ENGINE?	72
Berliet	79	Brake mean effective pressure	72, 76, 78
Bernard	79	Compression ratio	
Bristol	84	Combustion chamber design effects	73
Brno	84	Cooling relation to	73
Burmeister-Wain	78	Valve timing effects	73, 78
Caterpillar	23, 24, 26, 27, 28	Cooling, exhaust-valve	73
Citroen	79	Diesel	
Clerget	84	Foreign use of	77, 78, 79, 81
C. L. M.	78, 79, 84	Installation problems	
Coatalen	84	Air supply	308
Comet	79	Cooling system	309
Daimler-Benz	78, 80, 82	Engine controls	309
Delahaye	79	Engine removal	309, 310
English Electric	78	Engine suspension	
Gardner	79	Flexible installation	306, 307
General Motors	305	Moment of inertia, determination of	306, 307
Henschel	81, 82	Principal axis	306
Humboldt-Deutz	81, 82	Problem analyzed	305, 306
Jung	78	Exhaust system	308, 309
Junkers	77, 78, 79, 84	Fuel system	308
Kiel	82	Noise	308
Krupp	78, 79	Fuel consumption	
Latil	79	Ignition effects	
Lilloise	79, 84	Spark plug setting	76
M.A.N.	81, 82	Timing	76
Mercedes	79, 80, 84	Induction effects, manifold design	72, 73
Napier	84	Piston effects	76
Oberhansli	79	L-head	72, 76, 78
Perkins	82, 83, 84	Power	
Petters	78	Compression ratio effects	72
Peugeot	79	Factors affecting	72, 74
Renault	79	Fuel consumption affected by	72
Ricardo	79	Increase	
Rochet-Schneider	79	Means of	72, 76
Salmson	84	Purpose of	72
Saurer	78, 80, 81	Piston effects	76
Unic	79	Trends	76
Merits	403		
Oil cooler used with	27	Engines, Railcar	
Passenger car usage, specifications for	77	Diesel	
Progress	35	Control, remote	78
Railroad use of	477	Cost factor	477
Specifications, passenger-car usage	77	Foreign use of	77, 78, 82
Testing		Increase in use of	477
Combustion	117, 119, 120	Merits	477
Lubrication	37, 41	Foreign designs	82
Torque variation	305	Supercharging	82
Torsion damper, Lanchester type	80, 81		
Trends	77, 78	Engines, Tractor	
Two-stroke type	77, 78; 305	Diesel	41
Wear		Lubrication	41
Lubricant effects	36, 40, 41; 492, 493	Wear, test data	41
Metal effects	413		
(See also Crankshafts; Cylinders; Detonation; Engines, Aircraft; Engines, Motorcoach; Engines, Motor-Truck; Fuels; Oil Filters; and Pistons)			
Engines, Marine		F	
Diesel	77	Finishes	
Speed trends	77	Progress	366
		Trends	366
Engines, Motorcoach		Fleet Operation	
DIESEL-ENGINE INSTALLATION IN COACHES AND TRUCKS	305	THE UTILITY AND ECONOMICS OF SMALL PASSENGER CARS AND 1/2-TON TRUCKS	335
Aluminum used in	531	Cost factor	335, 336, 338, 339, 340, 341, 343
Diesel		Depreciation	336, 337, 339
Electric drive used with	58	Economical life of vehicles	336, 337
Foreign use of	81	Gadgets	337
Installation problems		Garaging	336
Air supply	308	Leased-car problems	343
Cooling system	309	Maintenance	
Engine controls	309	Cost trends	339
Engine removal	309, 310	Painting	339

S.A.E. TRANSACTIONS

	PAGE		PAGE
Fleet Operation (Concluded)		Fuels (Concluded)	
Passenger cars	335	Need	291
Personnel requirements	335, 336	Physical properties	291
Repair practices	337, 338	Problem analyzed	291, 292, 293, 294
Trucks, one-half-ton	335	Progress	291
Passenger cars	335	Prospects	291, 293
Personnel, driver training	337	Starting problem	293, 294
Purchasing policies	336	Volatility, low, difficulties due to	291, 292
Records, importance of	339	"Stunt" fuels, data on	392, 393, 394
Tires and tire-maintenance	338, 339	Swirl effects	391, 406
Trucks, one-half-ton	335	Vapor pressure	505
Vehicle design improvements		Car design affected by	141
Progress	340	Diesel	
Suggestion for future	341	Cost, United States and European compared	77
Vehicles, interesting uses of	341, 342	Rating	
(See also Motorcoach and Motor-Truck)		Cetane number	124, 140
		Data	124, 140
		Future predicted	141
		Octane number	
		Carbon deposits effects	218
		Engine adjustments effects	219
		Power affected by	214, 215
		Requirements	210, 211, 212, 215, 219
		Road octane number variability	210, 211, 215, 216
		Taxation	203
		Testing	
		Cooperative Fuel Research method	277, 278, 279, 280
		Knock characteristics	277, 278, 279, 280
		(See also Detonation, Fuel Factors; and Gasoline)	
Foreign Design and Operation		G	
Automobile		Gasoline	
Domestic and foreign compared	201	Aviation	
Door height, Germany	144	Future predicted	504, 505
Frameless cars	535, 536, 539	Octane number	237, 242; 503, 504, 505
People's car, Germany	143	Progress	503, 504
Progress	350	Vapor pressure	505
Test data	350	Octane number	
Engines		Carbon deposits effects	218
Aircraft		Detonation affected by	237, 242
Diesel, Germany	505, 506	Engine adjustments effects	219
European and American compared	512	Power affected by	214, 215
Germany	393, 400; 505, 506	Requirements	210, 211, 212, 215, 219
Great Britain	389, 390	Road octane number variability	210, 211, 215, 216
Testing	512	"Safety fuels" compared with	291
Diesel		Testing	
Combustion chamber types	77, 78, 79, 80, 81, 83	Cooperative Fuel Research method	277, 278, 279, 280
Designs described	78, 79, 80, 81, 82, 83, 84	Knock characteristics	277, 278, 279, 280
Domestic and foreign compared	77	(See also Detonation, Fuel Factors; and Fuels)	
Fuel feeding			
Injection timing	80		
Nozzles	78, 80, 83		
Pumps, progress	82, 84		
Specifications	77		
Trends	77, 78		
Two vs. four stroke cycle	77, 78		
Usage extent	77, 84		
Four-cylinder	201, 202		
Fuel consumption	203		
Valves, British	395		
Fuels, Great Britain	389, 390		
Spark plugs	400		
Taxation, fuel	203		
Frames		Gears	
Body unit construction with	6; 535	Hypoid	196, 198, 199, 220
Factors causing changes in	466	Lubrication	
Frameless car	535, 536, 537, 538, 539	Extreme pressure	193
Rigidity increase	3	Extreme-temperature-pressure	193
Trends	466	Seizure	
Width	466	Factors determining occurrence	193
X-members	466	Load effects	195, 196, 220
(See also Bodies)		Prevention	193
		Tests	194, 195
		Temperature	
		Bulk	193, 195, 220
		Flash	193, 194, 195
		Importance of	193
		Testing	193
Fuels		H	
AVIATION FUELS AND ENGINES	389	Headlighting	
PROSPECTS FOR USE OF "SAFETY FUELS" IN SPARK-IGNITION		Progress	460, 461
AIRCRAFT ENGINES	291	Sealed-beam	457, 460, 461
Aviation		Heat Treatment	
British usage	389, 390	WHAT IS NEW IN HEAT-TREATING METHODS, MATERIALS,	
Deposits, lead	393, 394	PROCESSES	351
Diesel, safety factor	505, 506	Cost data	354
Distillation characteristics	393	Fundamentals of	356
Fireproof		Future predicted	356
Need	291	Gases used in	354, 355, 356
Prospects	291	Methods described	353, 354
Future predicted	504, 505	Processes	354, 355, 356
Ignition temperatures, spontaneous	294	Progress	353
Iso-octane		Steel	353
Cost factor	504	Temperature control	354
Octane number	504, 505	Time saving	355
Lead distribution	393, 394	Tocco process	355
Octane number	389, 390, 392, 394, 404, 405		
Progress	503, 504		
Reference fuels, secondary	405, 406		
"Safety"			
Fire hazard reduced	505, 506		
Gasoline compared with	291		

SUBJECT INDEX

I		PAGE	L		PAGE
Ignition			Legislation		
SPARK TIMING—ITS RELATION TO ROAD OCTANE NUMBERS AND PERFORMANCE		210	Automobile operation and performance, inspection		280
Distributors		136, 137, 138, 139; 212, 213	Inspection		
Spark plugs			Compulsory		
Aircraft		503	Cost		280
British and American compared		398, 400	Merits		280
Ceramic		397, 398	Safety viewpoint		280
Earth wire effects		397	Usage extent		280
Gap, fuel consumption affected by		203	Voluntary compared with		280
Gas-tightness		398	Motorcoach operation and performance, inspection		280
Long-reach		203, 204	Motor-truck operation and performance, inspection		280
Materials		400	Taxation, fuel		203
Mica			Lubricants and Lubrication		
Pin-holing		398	"SEIZURE-DELAY" METHOD FOR DETERMINING THE SEIZURE		
Sinterkorund compared with		398	PROTECTION OF EP LUBRICANTS		193
Troubles due to		398	Compound		23, 24, 35, 42; 269; 485, 486, 487, 498, 499, 500; 511
Usage extent		397	Extreme pressure		
Sintered aluminum oxide		397, 398	Gear usage		193
Sinterkorund		397, 398	Research		193
Timing			Seizure prevention		193
Compression ratio effects		217	Extreme-temperature-pressure		
Control, automatic		242	Gear usage		193
Control devices		212, 213, 217	Seizure protection		
Fuel consumption affected by		211, 212	Data on		220
Importance of		211, 219	Seizure-delay method for determining		193, 200
Power affected by		211	Temperature factor		193, 199, 200, 220
			Test apparatus, Four-Ball		194, 195, 196, 197, 198, 199, 220
			Test method		195, 196
			Test results correlated		197, 198
Indicators, Engine			Machines used in tests		
ENGINE INDICATION WITH THE CATHODE-RAY OSCILLOGRAPH (E)		304	Four-Ball apparatus		194, 220
THE OSCILLOGRAPH IN ENGINE INDICATION (E)		304	S.A.E. Research type		197, 220
Cathode ray oscillograph		135; 304	Timken		197, 220
Diesel engine use of		117	Oil acidity		265, 266, 267
Makes			Oil depletion		270
Dodds Cosser		208	Oil filters		
Midgley		421	Fallacies regarding		259
Sunbury		452	Merits		259
Optical		421	Testing		
Oscillograph		541	Breaking-in		494, 500
Photo-electric type		117	Corrosion		489, 500
Torque meter			Flow-temperature relationship		264, 265
Field for		271, 274, 275	Ring sticking		487, 488, 500
Types of		271	Stability		495, 500
University of Wisconsin type		117	Wear		491, 493, 494, 500
			(See also Engine Operation and Performance, Lubrication; Engines, Aircraft, Lubrication; Engines, Diesel, Lubrication; Gears; and Oil Filters)		
Induction			M		
Distribution			Materials		
Air-fuel mixture ratio effects		126, 127	Body trim		370
Data		126, 127, 128	Car design affected by		141, 142
Manifolds			Glass, safety		469
Carburetor relation to		72; 128	Insulation, automobile body		229, 234
Design		72, 73; 128; 360	Plastics		229, 234; 369, 370; 466, 467, 470; 525
			Sound absorption		286, 287, 288, 289, 290
			Upholstery		470
			(See also Metals and Rubber)		
Instruments			Metals		
Accelerometers		2	Aircraft engine needs		504
Aircraft, torque meter			Automotive use of		144
Field for		271, 274, 275	Cast iron		
Types of		271	Cylinder material		50
Balancing machine		458	Ferritic		50
Bore wear testing		413, 414	Gray		417, 420
Camera		424, 429	Growth		303
Carbometer		351	Hardness		50, 51; 417, 419, 420
Engine wear testing		413, 414	Pearlitic		50
Kinetic Oiliness Testing Machine		492, 494	Piston-ring material		50
Noise meters		288, 289	Production		53
Riding-comfort recorder		44	Scaling		303
Riding qualities measurement		2	Valve guide material		302
Sound measurement		288, 289	Wear data		417, 418, 419, 420
Strain-gage		528	Inconel		460
Torque meter		271, 274, 275	Magnaflux testing		59, 68
Turbidimeter		352	Modulus of elasticity, importance of		141, 142
Wear testing		413, 414	Piston-ring materials		49, 50
(See also Indicators, Engine; and Testing)			Test methods, magnetic		59, 68
			Thick sheets, advantages of		144
			(See also Aluminum and Aluminum Alloys; Bearings, Metal; Corrosion and Corrosion Prevention; Heat Treatment; and Steels)		
International Foundry Congress		415			
K					
Knock					
(See Detonation)					

S.A.E. TRANSACTIONS

	PAGE		PAGE
Motor		Pistons	
(See Engine)		Aircraft, Diesel	506
Motorcoach Design and Operation		Cooling	76
LIGHT-WEIGHT TRANSPORTATION UNITS	526	Gumming, lubricant effects	487
Aluminum used in	526, 528, 529	Ideal operation described	76
Bodies		Rings	
Aluminum used in	528, 529	RECENT DEVELOPMENTS IN PISTON-RING MATERIALS	49
Chassisless	527	Anti-scaff qualities	417
Design requirements	527, 528	Gray-iron structures	417, 420
Local stability	529	Hardness	52
Makes, Greyhound Cruisers	108	Materials	
Progress	229	Coating	
Stresses	528	Metallic	49, 54, 58
Weight		Non-metallic	49, 54, 58
Air-conditioning relation to	529	Composition	49, 51, 52, 53
Reduction, importance of	526, 529	Finish	49, 54, 58
(See also Accidents and Accident Prevention, Motorcoach; Bodies, Motor-		Specifications	52
coach; Engines, Motorcoach; Electric Drive; Fleet Operation;		Structure	49, 51, 52, 53
Riding Qualities; Springs, Suspension; and Transmissions)		Surface finish	49, 54, 58
Motor-Truck Design and Operation		Sticking	23, 28, 35, 36; 324; 486, 487, 488, 500
LIGHT-WEIGHT TRANSPORTATION UNITS	526	Structures, gray-iron	417, 420
Aluminum used in	526, 527, 533	Testing	54, 56, 57, 58
Fleet-operation problems analyzed	335	Tinplating merits	49, 54, 56, 58
Operating problems analyzed	335	Wear	
(See also Accidents and Accident Prevention, Motor-Truck; Bodies,		Annealing effects	417
Motor-Truck; Engines, Motor-Truck; Fleet Operation; Riding		Causes analyzed	49
Qualities; and Springs, Suspension)		Causes classified	
		Abrasion	49, 50
		Corrosion	49, 50
		Erosion	49, 50
		Lubrication relation to	50
		Material effects	49, 50; 415, 416, 417
		Preventives	49, 54
		Scoring	49, 54, 58
		Scuffing	49, 54, 56, 57, 58
		Temperature effects	52; 417
		Testing	54, 56, 57, 58
		Weight loss	417
		Production	
		MAGNAFLUX INDICATIONS INTERPRETED	68
		MAGNAFLUX - WHAT DOES IT SHOW?	59
		Aircraft	
		Magnaflux testing	
		Applications	67
		Defects detected	
		Abrasion, surface	60
		Blowholes	60, 62
		Bursts	68, 70
		Classification	60, 68
		Cracks	60, 61, 62, 68, 70
		Description	60, 61, 62, 63, 64, 65, 68
		Distortion	60
		Flakes	70
		Flux density, variations in	60, 65
		Hairlines	60, 62, 64
		Inclusions	60, 62, 63, 64, 65, 68, 70
		Laps	68, 70
		Magnetic permeability, variations in	60, 65
		Tears, machining	68, 70
		Interpretation of	68, 71
		Merits	65, 67
		Method described	59, 68
		Purpose	59, 68
		Metal, flush riveting	325
		Cast iron	53
		Coordinating design and production	
		Aircraft engine	85, 92
		Methods	85, 92
		Reasons	85, 92
		Feritex treatment	304
		Ferrox treatment	304
		Finish, wear affected by	49, 54, 58
		Magnaflux testing	59, 68
		Superfinish	303, 304
		(See also Aircraft Design and Construction, Production; and Engines,	
		Aircraft, Production)	
		R	
		Railcars	
		Air conditioning	531
		Aluminum used in	531, 532
		Doors	532
		Interior finish	532
		Seats	532
		P	
		Passenger Car	
		(See Automobile)	
		N	
		National Advisory Committee for Aeronautics	161; 223; 258, 271; 501, 502, 510
		National Aeronautic Association	153
		National Bureau of Standards	449
		O	
		Oil	
		(See Lubricants and Lubrication)	
		Oil Filters	
		FILTERING FALLACIES	259
		SOME DEVELOPMENTS RELATIVE TO CRANKCASE-OIL FILTRATION	23
		Additives	269
		Air cleaner usage relation to	26, 28; 268, 269
		Bypass method	28
		Cleanliness	261
		Clogging	496
		Crankcase drains	261, 262
		Depletion of oil	270
		Diesel engine use of	24
		Engine design effects	268
		Fallacies regarding use of	259
		Filter capacity	261
		Function	24, 28
		Gumming	269
		Improvements needed	263, 264
		Installation	260
		Media	260, 263
		Moisture accumulation	265
		Need for	260
		Oil acidity	265, 266, 267
		Oil color	268
		Oil drainage periods affected by	27, 28; 263, 270
		Oil expense reduced by	263
		Oxidation effects	269, 270
		Problem, complexity of	270
		Testing	25, 26, 28
		Types	24, 25, 26, 27, 28
		Usage extent	459
		Used oil examinations, data from	262
		Omnibus	
		(See Motorcoach)	

SUBJECT INDEX

	PAGE		PAGE
Riding Qualities		Rubber (Concluded)	
Harshness in the Automobile	1	Stress limitation	
Accelerations		Factors involved	17, 18, 22
Data on	2	Need for	17, 18
Importance of	3	Stress-strain curves	475, 476
Reduction means	3	Synthetic	16
Types of	1, 2, 3	Temperature rise caused by elongation	17
Factors affecting	1; 231, 232, 233, 234	Testing	476, 477
Harshness		Tires	234
Definition of	1	Vulcanization	16, 17, 22
Driver affected by	1	(See also Springs, Suspension, Rubber)	
Human reaction to	1		
Insulators used to decrease	7	S	
Measurement methods		S.A.E.	
Instrument usage	2	International Automotive Engineering Congress	501
Laboratory	2	Manly's contribution to	153
Road	2	(See also Cooperative-Fuel Research)	
Reduction methods	3, 6, 7	Science, Some 1938 Advances Cited	295
Rigidity effects	3, 4, 6, 7		
Speed relation to	1	Shock Absorbers	
Spring, suspension effects		Shock cushioners	7
Conventional type	3	Trends	468
Independent wheel	3	Types	468
Types of	1	Smithsonian Institution	145
Ideal ride described	1		
Road surface effects	1	Springs, Suspension	
Testing		RUBBER SUSPENSION	471
Harshness	2	TRENDS IN COMMERCIAL-VEHICLE SPRING SUSPENSION	104
Instruments for	2, 44, 48	Design improvements	108; 471
Rigidity, structural	4, 5	Durability factor	108
Vibration	2, 4	Frequency formula	104
Tire effects	43, 48; 231, 232, 234	Front	
Vehicle design effects		Angle	466
Rear-engine mounting	229, 234	Deflection rate	466
Seat cushions	94	Independent	457, 465, 466
Shock absorbers	231	Length	466
Springs, suspension	231, 234	Progress	465, 466
Vibration	1, 43, 44, 45, 48	Fundamentals of	104, 105
(See also Instruments; and Tires and Rims)		Hotchkiss Drive	107
		Independent front, usage extent	457
Rims		Leaf	
(See Tires and Rims)		Advances, recent	107
		Competition with	107
Rubber		Loading effects	105, 106, 107
RUBBER AS A LOAD-CARRYING MATERIAL	15	"Magnaflect"	106, 107
THE DEVELOPMENT OF FOAMED-LATEX CUSHIONING	93	Material effects	105
Automotive use of	15, 22; 233, 234	Motorcoach	
Body mounting	470	Design improvements	108
Compression	20, 22	Passenger-car problems compared with	105
Creep	15, 16, 18, 20, 22; 474	Motor-truck	
Engine mounting	286, 288; 461	Design improvements	108
Foamed latex		Passenger-car problems compared with	105
Air conditioning of	95, 96	Parabolic-edged spring steel	107, 108
Applications	93	Rear, trends	465
Body use of		Riding qualities affected by	3; 234
Seat cushions	93; 468, 470	Rubber	
Testing	94, 95, 96	Merits	234
Cost factor	93, 94	"Torsilastic"	
Durability	95	Advantages	472, 473, 477
History	93	Applications	472
Merits	94, 95, 96	Characteristics	473, 474
Processing	95	Deflection	
Ventilating properties	95, 96	Radial	473
Hardness	17, 19, 22	Resistance to	473
History	15	Description	471, 472
Hysteresis	16, 17, 20, 21, 22; 473	Diagrams	475
Load-carrying use		Trends	233; 465, 466
Considerations involved	15	Types described	18, 19, 20, 21, 22; 471
Limitations	15	Shackles	465
Raw, characteristics of	15, 16, 17	Stabilizers	465, 466
Seat cushion use	93; 468, 469, 470	Steel	107, 108
Set	15	Stresses	108
Shearing stress	474, 475	Torsion-rod type	106
Shear modulus, hardness relation to	18, 19	Trends	231; 465
Slippage	15, 16, 18, 22	Variable-rate	106, 108
Springs, suspension		Weight	
Compression discs	22	Items determining	105
Flat-plate type	18	Saving	108
Hollow cylinder type	22	Types compared	105
Load-deflection curves	19	(See also Rubber, Springs, Suspension)	
Merits	234	Steels	
Railroad-truck type	21, 22	"Abnormal"	353
Round-stage type	19, 20	Alloy type	352, 353
Shackles	465	Aluminum compared with	529, 532, 533
Torsion type	20, 21; 84; 471	Amola	352, 353
Trends	233; 465, 466		

S.A.E. TRANSACTIONS

Steels (Concluded)

	PAGE
Austenitic	298
Automotive use of	351
Bodies	536, 537
Carbometer	351
Carbon type	352, 353
Deoxidizers	352
Durachrome	303
Feritex treatment	304
Ferrox treatment	304
Grain control	351, 352
Grain flow	296, 301, 302
Hardenable	298
Leaded	352
Machining problems	352
Precipitation-hardening	298, 299
Production	352
Progress	351, 352
Silcrome	298, 299, 300, 301
Springs, suspension	107, 108
Stellite	295, 300
Superfinish	303, 304
Turbidimeter	352
Valve	
Aircraft	295, 296
Analyses	301
Automobile	298, 299, 300
Physical properties	301

(See also Heat Treatment)

Steering Systems

"Center-point"	466
Makes, Gemmer	467
Modifications	467
Oversteering	143
Steering ratio	466
Tire effects	143, 344
Trends	466, 467
Types	467
Understeering	143
Wheels	
Plastics used in	466, 467
Progress	467

Superchargers and Supercharging

Aircraft	
Diesel	506
Exhaust turbo type merits	502
Future predicted	502
Intercoolers	502
Progress	502
Types compared	502
Blowers	
Turbo type	82, 502
Two-speed	403
Railcar engine usage	82

T

Temperature

Detonation affected by	156
Exhaust gas	154
Piston	154, 156, 157, 160
Spark plug	154, 156
Valve	154, 156, 157, 160

Testing

Aircraft	
Flight	444
Flight tests, pioneering	149, 150, 151
High-lift devices	161
Langley airplane	149, 150, 151
Manly's tests	149, 150, 151
National Advisory Committee for Aeronautics	161
Production, Magnaflux method	59, 68
Wind tunnel	161
Bearings	517, 518, 520, 522, 524
Engines	
Aircraft	
Endurance	512
European and American compared	512
Lubrication	8, 9, 13, 14, 511
Combustion	424, 425, 428, 429
Diesel	
Combustion	117, 119, 120
Lubrication	37, 41

Testing (Concluded)

Fuel consumption	31
Road-load economy	31
Tank mileage	33, 34
Wear	
Data	414, 415, 417, 418, 419, 420
Machine described	413, 414
Fuels	
Cooperative Fuel Research method	277, 278, 279, 280, 449
Knock characteristics	277, 278, 279, 280
Gasoline	
Cooperative Fuel Research method	277, 278, 279, 280, 449
Knock characteristics	277, 278, 279, 280
Lubrication	
Aircraft engine	8, 9, 13, 14, 511
Breaking-in	494, 500
Compound	486
Corrosion	489, 500
Diesel	486
Ring sticking	487, 500
Sludge formation	324, 334
Stability	495, 500
Wear	491, 493, 494, 500
Metals, Magnaflux method	59, 68
Noise	281, 282, 283, 284, 285
Oil filters	25, 26, 27
Piston wear	54, 56, 57, 58
Riding qualities	
Instruments for	2, 44, 48
Vehicle characteristics	2, 4, 5
Rubber	476, 477
Seat cushions	94, 95, 96
Tires	345, 346, 347, 348, 349, 350

(See also Detonation, Testing; and Instruments)

Tire and Rim Association

46; 245

Tires and Rims

DESIGNING THE TIRE FOR THE CAR	243
NEEDED TIRE IMPROVEMENTS	(E) 140
PASSENGER-CAR TIRES AS SEEN TODAY BY THE AUTOMOTIVE ENGINEER	(E) 140
TIRE BEHAVIOR IN STEERING	344
TIRE DESIGN FACTORS INFLUENCING CONTROL OF VIBRATION	43
Balance	43, 48
Camber thrust	345, 349, 350
Car stability affected by	344
Components	
Beads	244
Body plies	243, 244
Chafers	244
Cushion	244
Reinforce	244
Sidewall	244
Tread	244
Tread plies	244
Coordination, tire and car	46, 47
Cornering	249, 345, 349, 350
Failure, types of	245, 246, 247, 251
History	247
Improvements made	247, 248, 249
Improvements suggested	140
Inflation pressure	
Effect of increase in	349
Stability affected by	249
Trends	43, 46, 48
Load	349
Noise	
Expansion-joint	47
Reduction of	47
Road effects	47
Types of	250, 251
Progress	43, 48; 233, 247, 248
Quietness	47
Radial rate	46
Riding qualities affected by	43, 48; 231, 232, 234
Runout	43, 48
Service factors	245
Shimmy	250
Size	
Car performance influenced by	143
Car weight relation to	465
Importance of	48
Lateral resistance relation to	143
Stability affected by	249
Standardization	46
Trends	43, 46, 48; 465

SUBJECT INDEX

	PAGE		PAGE
Tires and Rims (Concluded)		Trucks	
Skidding	249, 250	(See Motor-Truck)	
Slip angle	345, 349, 350		
Specifications, results of changing from	48		
Stability	249; 344, 345, 350		
Steering affected by	344		
Testing			
Data	347, 348, 349, 350		
Machine described	345, 346		
Tire rating, proposed method	251		
Tire static	251		
Torque			
Driving and braking	345, 349, 350		
Self-aligning	345, 349, 350		
Traction			
Side-skid resistance	249, 250		
Stopping ability	249		
Tread movement, measurement of	247		
Tread wear			
Factors affecting	247		
Foreign data on	251		
Vibration			
Control			
Absorption tests	45		
Data on	45		
Design factors affecting	43		
Road effects	47		
Types classified	43		
Wear relation to	48		
Wear			
Causes	48		
Speed effects	144		
Vibration relation to	48		
Weight analysis	249		
(See also Riding Qualities)			
Transmissions			
HYDRODYNAMIC POWER TRANSMISSION FOR MOTOR CARS	433		
Automatic	232; 433; 461		
Change gear, hydrodynamic			
Gear box combined with	442		
Shifting, automatic	441; 442, 443		
Single-circuit	440, 441		
Two-circuit	440		
Control	462, 463		
Coupling, hydrodynamic			
Data	434, 435, 436		
Mechanical gear combined with	435		
Properties of	434		
Torque characteristics	434, 435		
Torque converter compared with	438		
Fluid drive	461, 462		
Gearshifting	232; 441, 442, 443; 462, 463		
Hydra-Matic	461, 462, 463		
Hydraulic and hydrodynamic differentiated	433		
Hydrodynamic			
Advantages	443		
Basic idea	433		
Change gear	439, 440, 441, 442		
Cost factor	443		
Coupling	433, 434, 435, 436, 438		
Hydraulic differentiated from	433		
Mechanical compared with	442, 443		
Origin	433		
Safety factor	443		
Torque converter	434, 436, 437		
Liquid flywheel	461		
Makes			
Lysholm-Smith	439		
Mono-Drive	232		
Rieseler	439		
Warner	464		
Motorcoach, Diesel-electric drive	58		
Overdrive	461, 462, 463, 464		
Progress	457, 461, 462, 463, 464		
Torque converter			
Hydraulic	433		
Hydrodynamic			
Coupling compared with	438		
Data	436, 437		
Definition	434		
Mechanical gear combined with	438, 439		
Properties of	436, 437		
Vacuum shift	463		
(See also Electric Drive)			
		V	
		Valves and Valve Gear	
		AIRCRAFT-ENGINE VALVE MECHANISMS	109
		THE TREND IN POPPET VALVES	295
		Aircraft	
		Automobile valves compared with	298
		British usage	395
		Cooling, sodium	297, 298; 395
		Data on	109
		Exhaust	295, 296; 395
		Steels	295, 296
		Automobile	
		Aircraft valves compared with	298
		Steels	298, 299, 300
		Cams	109, 110, 111, 112, 113
		Cooling	
		Factors involved	73, 74, 75
		Importance of	114, 115
		Internal	115
		Sodium	297, 298; 395
		Design requirements	110, 111, 112, 113
		Exhaust	
		Aircraft	295, 296; 395
		British usage	395
		Cooling	73; 395
		Steels	295, 296
		Failure causes	75
		False motion	
		Definition	109
		Effects	109, 110
		Grain flow	296, 301, 302
		Guides	302
		Heads, Brightray treatment	
		Merits	395, 406
		Stellite compared with	395
		Insert materials	395
		Lift diagrams	110, 111, 112
		Lifters, hydraulic	73, 74, 76, 92; 112, 113; 458, 459
		Material requirements	113, 114, 115, 116
		Poppet valve trends	295
		Progress	459
		Ramp formula	92
		Retainer locks	303
		Rotating	301, 302
		Seating velocity	110, 112
		Seats	
		Angle	73, 74, 92; 395, 396
		Inserts	116; 303
		Wear	111, 112
		Width	73
		Sleeve	
		Burt type	395, 396
		Future predicted	510
		Merits	510
		Opinions on	396, 397
		Poppet compared with	396, 397, 402; 510
		Single	395, 396
		Springs	73, 78
		Steels	113, 114, 115; 295, 296, 298, 299, 300, 301; 395
		Stellite used in	116
		Stems	395
		Sticking	302
		Tappets	73, 74
		Technique, British	395
		Temperature	74, 75; 114, 115, 116
		Test data	109, 110
		Testing, glass valves used for	297, 298
		Timing	73, 76; 113
		W	
		Wheels	
		Aluminum used in	531, 534
		Enclosed	229, 234
		Future predicted	229, 234
		Wrecks	
		(See Accidents and Accident Prevention)	

General Editorial Section

Author Index

AUTHOR	TITLE OF PAPER	PAGE
Abbott, Ernest J.	Measuring Surface Finish in Production	Mr 24
Adams, Harold W.	Design and Shop Problems in High-Pressure Hydraulic Systems	No 14
Ager, Harold	What Oregon State College Is Doing that Is Important to Pacific Coast Motor Vehicle Operators	No 32
Aiken, N. J.	A New Emphasis in Industrial Management	Fe 47; Oc 26
Ainsley, W. G.	Keeping Up to Date in Motor Fuels	Fe 39
Alden, R. C.; H. M. Trimble, and M. G. Blair	Vaporization Characteristics of Current Winter Motor Fuels	De 10
Allen, Edwin L.	Body Engineering - Past, Present, and Conjecture as to Future	Jl 21
Allen, E. T.	The Testing of Large Aircraft	Jl 28
Alter, Dinsmore	The Zeiss Optical Planetarium	Mr 17
Altwickler, H.	Use of Magnesium Alloys in the European Automotive Industry	Jl 29; (P) Se 9
Andreau, J.	Modern European Light Cars	Jl 18
Anthony, C. G.	Reducing Costs	No 32
Appel, W. D.	Some Aspects of Frameless Car Design	Jl 16
Arismendi, C.	The Use of Reclaimed Oil	Ap 26
Arnold, Major Gen. Henry H.	Performance and Development Trends in Military Aircraft and Accessories	Fe 20
Banks, F. R.	Aviation Fuels and Engines	Jl (Sec. 2) 11
Barger, E. L.	Observations on Tractor Fuels - Characteristics and Requirements	De 10
Barnard, D. P.	Keeping Up to Date in Motor Fuels	Fe 39
Baster, F. S.	Why Not 125 BMEP for an L-Head Engine	Fe 38
Baylies, A. L.	The Modern Mechanized Army	My 27
Beall, A. L.	Piston Ring Performance and Its Relation to Lubrication	Mr 11; Oc 26
Beall, W. E., and E. Gifford Emery	Problems of Submerged Engine Installations	No 21
Beard, M. G., and E. W. Fuller	Feathering Propellers in Airline Operation	Ap 20
Becker, A. E.	Knock-Rating Control	Jl (Sec. 2) 16
Bel Geddes, Norman	Highways of Tomorrow	No 26
Benninghoff, W. E.	Differential Hardening the Induction Method	No 29
Berlin, Don R.	Aircraft Production Problems	Jn 23
Berlin, Don R.	Flush Riveting - Considerations for Quantity Production	Ap 10
Bevins, Russell	Motor Vehicle Regulations	Fe 47
Bissell, T. A.	Trends in Design of 1940 Cars	De 26
Blackwood, A. J., and G. H. Cloud	Diesel Fuel Characteristics Influencing Power and Economy	Jl (Sec. 2) 15
Blackwood, A. J.; C. B. Kass and O. G. Lewis	Automotive Multicylinder Engine Detonation and Mixture Distribution	Fe 35
Blair, M. G.; R. C. Alden and H. M. Trimble	Vaporization Characteristics of Current Winter Motor Fuels	De 10
Blanchard, Harold F.	1940 Cars	De 16
Blok, H.	Fundamental Mechanical Aspects of Boundary Lubrication	Jl 41
Blok, H.	"Seizure-Delay" Method for Determining the Protection Against Seizure Afforded by Extreme-Pressure Lubricants	Mr 22
Booth, R. G., and T. H. Mullen	Depreciation	No 33
Bower, L. L.	Hesselman Oil Engine	Jl 50
Boyd, T. A.	Engine Flame Researches	Jl (Sec. 2) 16
Brady, George W.	Propeller Requirements for Submerged Engine Installation	No 21
Brady, George W.	Trend of Controllable Propeller Requirements	My 28

Abbreviations Used:

January, Jn
February, Fe
March, Mr

April, Ap
May, My
June, Je

Months of the Year

July, Jl
August, Ag
September, Se

October, Oc
November, No
December, De

(P) indicates paper published in full.

AUTHOR INDEX

AUTHOR	TITLE OF PAPER	PAGE
Brazier, J. V., and Sidney Born	Characteristics Relative to Ring-Sticking and Engine Cleanliness of Midcontinent Lubricating Oils	Mr 22
Bridgeman, O. C.	Investigation of Vapor Lock in Aircraft Fuel Systems	No 21
Bridgeman, O. C.	Investigation of Vapor Lock in Aviation Fuel Systems	Mr 26
Broeze, J. J., and J. O. Hinze	Experiments with Doped Fuels for High-Speed Diesel Engines	Jl 35
Brown, Gordon	Fundamental Characteristics of Moldable Plastics	My 15; (P) Oc 9
Browne, K. A.	Dynamic Suspension, a Method of Aircraft-Engine Mounting	Fe 31
Brull, Charles B.	Modern European Light Cars	Jl 18
Bull, A. W.	Tire Behavior in Steering	Jl 20
Bunce, John	Commercial Aviation	Ap 25
Burk, F. C.	Service Tests on Various Lubricants in a Fleet of Refinery Delivery Trucks	Fe 47; Oc 26
Burns, W. J.	Carburetor Operation and Maintenance	Mr 9
Cadwell, S. M.; R. A. Merrill, C. M. Sloman and F. L. Yost	Dynamic Fatigue Life of Rubber	No 30
Calhoun, Leslie D.	The Early Development of the Diesel Engine	Ap 30; No 34
Calhoun, Leslie D.	The Trunk-Type Two-Cycle Diesel Marine Engine	No 25
Cameron, W. J.	Machine Civilization	Jl 16
Canning, William S., and A. Ludlow Clayden	The Past, Present and Future of Cooperative Progress	Jl (Sec. 2) 17
Carr, N. O.	Army Transport Mechanization	Mr 11
Cato, E. Raymond	Problems of Regulation	Fe 48
Champion, A. R.	A Photoelectric Wave Generator	Ap 26
Chapman, Everett	Welded Steel Cylinder Blocks	Fe 25
Chapman, Everett	Welding Methods	Mr 10
Christen, Harvey C.	Influence of Design on Cost	Mr 26
Clark, V. E.	A Low-Density Aircraft Material	Jl 28; (E)* Oc 12
Clayden, A. Ludlow	Oil, Bearings and Pistons	Jn 24
Clayden, A. Ludlow and William S. Canning	The Past, Present and Future of Cooperative Progress	Jl (Sec. 2) 17
Cloud, G. H., and A. J. Blackwood	Diesel Fuel Characteristics Influencing Power and Economy	Jl (Sec. 2) 15
Coffee, I. E.	Starting	Jn 25
Collins, F. T.	Oiliness of Oil	Ap 26
Collins, Robert J.	Operation and Maintenance Problems of a Utility Fleet	Mr 23
Colwell, A. T.	The Trend in Poppet Valves	Fe 17
Colwell, A. T.	What the Parts Manufacturer Can Do To Reduce the Cost of Operation	No 33
Connolly, J. H.	Supercharging the Light Automobile	Ap 26
Cooke, Harte	The Development of the Modern Diesel Engine	Je 19
Cornelius, Walter; G. M. Rassweiler and Lloyd Withrow	Flame Propagation and Pressure Development	Ap 30
Coveney, Richard J.	Testing Car Performance	Jn 21
Crane, Henry M.	What Motor Cars Can Be	Mr 9
Crawford, J. M.	Factors Influencing Engineering Organization	Fe 38
Cumming, W. J.	Factors in Bus Engine Wear	De 12
Dallas, Allan W.	A Report of Studies and Tests to Decrease Aircraft Fire Hazards	Ap 21
Damon, Ralph S.	Top-Flight Aviation	Je 15
Davidson, William J.	Diesel Engines	Ap 30; My 22
Davies, J. M.	Power Applications for Movement of Earth	De 13
Davies, S. J., and Edmund Giffen	Processes in Injection Systems of Oil Engines	Jl 34
Davis, Ernest F.	What Is New in Heat Treating Methods, Materials and Processes	Jl 45
Deanesly, R. M.	Raising Octane Numbers	No 27
DeLong, James E.	Comparative Utilization of Gasoline, Hesselman, and Diesel Engines	Jl 31
Dick, Burns	The Latest Developments in Power and Hydraulic Brakes	Jn 25
Dillstrom, Torbjorn	Single-Plunger Multicylinder Fuel-Injection Pumps	Jl 34
Dilts, Arthur	Trends in Agricultural Tractors	Fe 47
Dreyfuss, Henry	Art on Wheels	Jn 24
Dryden, H. L.	Some Phases of Wind-Tunnel Work	Ap 22
Dunham, Walter E.	The Transportation Container	Mr 22
Dunstan, A. E.	Petroleum - Today and Tomorrow	Jl 35
Eads, Ottie	Comparative Tests in the Use of Propane, Butane, and Acetylene Gas in Cutting Steel	Jl 51

*(E) indicates excerpt published.

S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

AUTHOR	TITLE OF PAPER	PAGE
Eads, Ottie, and W. T. Tiffin	Metal Cutting Tests Using Butane, Propane and Acetylene	De 13
Ebinger, Adam	Bus Maintenance as Related to Mass Transportation in an Urban Center	Oc 25
Ebinger, Adam, and A. L. Heintze	A Study of Lubricating Problems in Rear-Mounted Engines	Je 16; No 33
Egloff, Gustav	Keeping Up to Date in Motor Fuels	Fe 39
Ellies, E. E.	The Development of Foamed Latex Cushioning	Fe 27
Emery, E. Gifford, and W. E. Beall	Problems of Submerged Engine Installations	No 21
Emery, E. Gifford, and Edward C. Wells	Giant Transoceanic Seaplanes	Jl (Sec. 2) 10
Everett, H. A., and G. H. Keller	The Testing of Lubricating Oil Stability in Small Engines	Jl 39
Fales, Dean A.	The 1940 Models	De 23
Fales, Dean A.	Trends in 1939 Cars	Jn 21
Farrell, C. E.	Proving Ground and Road Tests Compared	No 23
Faulkner, F. L.	Factors in Engine Wear	De 12
Fawcett, L. L.	Tuning Motors on a Chassis Dynamometer	Mr 22
Fisher, J. B.	Accelerated Wear Tests	No 23
Fisher, W. S.	Diesel Engine Installation in Coaches and Trucks	Fe 17
Fisher, J. B.	Effect of Turbulence on Combustion	Je 15
Fisher, J. B.	Fuel and Lubricant Requirements for Gasoline, Compression-Ignition, and Spark-Ignition Oil Engines	Fe 35
Fox, L. W., and A. L. MacCracken	New Life in Fleet Tires	De 11
Frank, F. C., and Henry H. Kerr	Airplane Brake Installation and Control Considerations	No 13
Freyermuth, George H.	Magic by the Gallon	Je 19
Frudden, C. E.	What the Society Can Do for the Student Branch	My 27
Fuller, E. W., and M. G. Beard	Feathering Propellers in Airline Operation	Ap 20
Gay, E. J.	The Importance of Periodic Engine Tune-Up	Fe 50
Gazley, Richard C.	Super High-Frequency Radio Beam	My 24
Gebhardt, W. A.	Highlights of Carburetion	Ap 29
Gephart, Valentine	Metal-Cleaning Methods	No 31
Geschelin, Joseph	An Analysis of Current Automobile Design	Jn 25, Jn 26
Gibbins, Major Gen. Henry	Military Motor Vehicles - The Problems of the Quartermaster Corps	Fe 19
Giffen, Edmund, and S. J. Davies	Processes in Injection Systems of Oil Engines	Jl 34
Going, Jim	Instrument Flying	De 25
Gould, R. E.	Trends in Mobile Air Conditioning	Fe 28
Grant, L. B.	Production of Magnesium Alloy Aircraft Parts	No 21
Gray, Carl Raymond, Jr.	Modern Streamlined Railroad	De 16
Gray, H. Liggett	Automotive Maintenance Cleaning Operations	De 13
Grebe, John J.	Adventures in Research	Jl 48
Green, G. A.	Power Transmission for Buses	Jl 30
Gregory, A. T.	Progress in the Development of Inline Air-Cooled Engines	No 16
Grigsby, H. R.	Maintenance and Utilization of a Public Utility Fleet	No 23
Griswold, R. W., II, and R. C. Molloy	The Characteristics of a Deflector-Plate Flap	Fe 29
Gruse, W. A., and C. J. Livingstone	Engine Deposits - Causes and Effects	Je 16
Hale, J. E.	Why Continue to Use High-Pressure Truck Tires?	Fe 50
Hamilton, Parker	Polaroid Lighting	Ap 26
Harrigan, William	Concerning Automobile Road Testing	Jl 32
Harris, Brig. Gen. C. T., Jr.	Industrial Mobilization for National Defense	Fe 19
Harrison, Edward E.	Device Indicates Miles Per Gallon	Oc 23
Hawkins, P. E.	Public Utility Bodies and Associated Equipment	Fe 49
Heacock, B. C.	The Track-Type Tractor's Contribution to Economic and Social Progress	Jl 29
Hebl, L. E., and T. B. Rendel	Spark Timing and Its Relation to Road Octane Numbers and Engine Performance	Fe 34
Heinlein, Fred	Engine Deposits - Causes and Effects	Fe 50
Heintze, A. L.	Bus-Engine Lubrication Problems	Mr 11
Heintze, A. L., and Adam Ebinger	A Study of Lubricating Problems in Rear-Mounted Engines	Je 16; No 33
Herliby, J. A.	Safety in Air Transportation	Mr 26
Herrington, A. W. S.	Military Automotive Equipment	De 14, De 23
Herrington, A. W. S.	The Automotive Equipment of a Modern Army	Ap 24; My 16
Hersey, D. S.	Fuel Economy Possibilities of the Otto-Cycle Aircraft Engine	Ap 20
Hertel, Courtney	Interchangeability in Modern Aircraft Production	No 15
Hill, H. C.	Design Problems in the Quantity Production of Aircraft	No 16
Hilt, J. J.	Why the Milwaukee Section is Interested in the Student Branch	My 27

AUTHOR INDEX

AUTHOR	TITLE OF PAPER	PAGE
Hinze, J. O., and J. J. Broeze	Experiments with Doped Fuels for High-Speed Diesel Engines	Jl 35
Hite, W. A.	Engineering Experimental Aircraft	No 16
Hives, E. W., and F. Ll. Smith	High-Output Aircraft Engines	Jl 24
Hood, Manley	The Effects of Rivets and Surface Roughness on Drag	Ap 10
Hope, G. A., and W. S. Mount	Relation of Diesel Fuel Properties to Their Engine Performance	Jl 38
Horine, Merrill C.	How Motor Trucks May Develop	De 24
Horine, Merrill C.	Tire Sizes - Not More but Better	Oc 24
Horridge, R. C.	Motor-Vehicle Fleet Operation and Maintenance	Mr 23
Howard, Covert W.	Air Conditioning of Passenger Cars	Jl 52
Howe, T. C.	Bus Maintenance Problems and Practices	Jn 20; Fe 48; No 32
Huber, Paul, and E. E. Wilson	Passenger Car Road Noise	Fe 27
Hurn, James E.	The Effect of Oil Filters on Tractor Engines	No 12
Jabelmann, Otto	Pioneering the Diesel Electric Streamliners	My 28
James, W. S.	Pneumatic Tires as They Should Be Engineered for Our Future Cars	Fe 26
Jansen, P. N.	Accelerated Aircraft Production for National Defense	No 16
Jardine, Frank; A. H. Woollen and D. S. Mussey	Light-Weight Transportation Units	Jl 30
Jennings, Henry	New Kinks in Live Truck Operations	Oc 25
Johnson, L. W.	Multicylinder Engine Adaptations in Oil Industry	Mr 23
Johnson, R. E., and W. G. Lundquist	BMEP Parameter for Cruising Power Control	Fe 31
Kass, C. B.; A. J. Blackwood and O. G. Lewis	Automotive Multicylinder Engine Detonation and Mixture Distribution	Fe 35
Kearns, Charles M.	Vibration Characteristics of Aircraft Engine-Propeller Systems	Jl 25
Keller, G. H., and H. A. Everett	The Testing of Lubricating Oil Stability in Small Engines	Jl 39
Kelly, R. D.	Airline Engineering	Je 15
Kelly, R. D.	Airplane Development	No 26
Kerr, Henry H., and F. C. Frank	Airplane Brake Installation and Control Considerations	No 13
Kettering, C. F.	Engineers' Problems in the World of Tomorrow	Jl 14
Kishline, F. F.	Symposium on Troubles from Varnish in Engines	Fe 15
Kittler, M. J.	A Non-Icing, Fully Maneuverable Aircraft Carburetor	Fe 31
Knudsen, W. S.	Automobile Engineering	Jl 45
Kramp, Harry	Portable Well-Servicing Equipment	Jl 51
Krotz, A. S.	Rubber for Suspension	Je 16
Kunc, J. F., Jr.; F. L. Miller and R. W. Richardson	Laboratory Tests as a Means of Evaluating Performance of Lubricants	Jl 39
Lane, Paul S.	Bore Wear from the Viewpoint of Materials	Jl (Sec. 2) 19
Lansing, J. H., and Enrique Touceda	Developments in Malleable-Iron Practice and Their Automotive Applications	Jl 44
Lansing, R. P.	Present-Day Problems in Accessory Drive	Ap 12
Lansing, R. P., and C. I. MacNeil	Accessories and Flying Aids Contributing to Safety of Operation	Mr 26
Larsen, N. P.	Present and Future Trends in Public Utility Equipment	Fe 49
Laurie, G. W.	Factors Affecting Engine Wear	De 13
Leadbetter, Ralph	Evolution of Air Distribution in Ventilating Systems	Mr 22
Lederer, Jerome	Notes on Loss Prevention in Civil Aviation	Mr 26
Lee, John	Tools for Aircraft Production	Jn 23
Lee, Ralph L.	Care, Feeding and Rearing of an Infant Industry	Je 14
Lewis, O. G.; A. J. Blackwood and C. B. Kass	Automotive Multicylinder Engine Detonation and Mixture Distribution	Fe 35
Lienesch, C. F.	Anilol, A New Auxiliary Fuel for Maximum Power with Economy	My 28
Lindsey, C. B.	Cost Control in City Bus Operation	No 32
Linsenmeyer, F. J.	Heating and Air-Conditioning of Automobiles	Oc 25
Livingstone, C. J., and W. A. Gruse	Engine Deposits - Causes and Effects	Je 16
Lombard, A. E.	Designing for Safety	Mr 26
Ludicke, H., and C. G. Williams	The Wear of Crankshafts with "Lead-Bronze" Bearings	Jl (Sec. 2) 19
Lundquist, W. G.	Airline Power Control with a Torque Meter	Ap 20
Lundquist, W. G., and R. E. Johnson	BMEP Parameter for Cruising Power Control	Fe 31
Macauley, J. B., Jr.	The Diesel in Trucks	Jl (Sec. 2) 14
MacCoull, Neil	Power Loss Accompanying Detonation	Fe 34
MacCoull, Neil	The CFR Shrouded Intake Valve	Jl (Sec. 2) 17
MacCracken, A. L., and L. W. Fox	New Life in Fleet Tires	De 11
MacFarlane, W. C.	Automotive Engineering in Agricultural Mechanization	Jl 29

S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

AUTHOR	TITLE OF PAPER	PAGE
MacNeil, C. I., and R. P. Lansing	Accessories and Flying Aids Contributing to Safety of Operation	Mr 26
Masi, Francis	Permissible Amplitudes of Torsional Vibration in Aircraft Engines	Ap 11
Mason, G. Grant, Jr.	American Aviation in World Affairs	Ap 9
Mathews, H. O.	Utility and Economics of Small Passenger Cars and 1/2-Ton Trucks	Jl 31; Jl (Sec. 2) 6
Maurer, Bernard	Automatic Unit Injection Pump	Jl 49
Maynard, W. A.	Two-Cycle Diesel Engine	Ap 28
Mayo, E. L.	Factors Affecting the Air-Conditioning Design of Vehicles	Ap 29; No 33
Mayo, R. H.	The Composite Aircraft	Jl 26
McGuire, E. C.	Maintenance of Army and CCC Motor Transportation in the Ninth Corps Area	No 32
Menz, C. N., and T. R. Stenberg	Brake Lining Testing Machines and Methods	De 22
Merrill, R. A.; S. M. Cadwell, C. M. Sloman, and F. L. Yost	Dynamic Fatigue Life of Rubber	No 30
Miller, F. L.	Bearing Wear	Ap 28
Miller, F. L.; J. F. Kunc, Jr., and R. W. Richardson	Laboratory Tests as a Means of Evaluating Performance of Lubricants	Jl 39
Miller, F. L., and W. C. Winning	Some Factors Affecting Wear in Heavy-Duty Engines	No 22
Mock, F. C.	Present Prospects for Use of "Safety Fuels" in Spark-Ignition Aircraft Engines	Ap 21
Molloy, R. C., and R. W. Griswold, II	The Characteristics of a Deflector-Plate Flap	Fe 29
Monahan, Fred	Considerations of Safety, Comfort, Appearance and Economy	Jl 49
Moore, Lewis B.	Automobile Headlamps	De 22
Moore, Walter E.	Automotive Headlighting	Jl 52
Moreland, Watt L.	The West's Contribution to Low Cost Motor Operation	No 32
Mougey, H. C.	Underwood Oxidation Test and Its Correlation with Diesel Service	Jl 40
Mount, W. S., and G. A. Hope	Relation of Diesel Fuel Properties to Their Engine Performance	Jl 38
Mullen, T. H., and R. G. Booth	Depreciation	No 33
Mummert, A. J.	The Metallurgical Aspects of Pistons and Piston Rings	Jn 25
Murray, Albert	Progress in Television	Fe 14
Mussey, D. S.; Frank Jardine and A. H. Woollen	Light-Weight Transportation Units	Jl 30
Mussey, William H.	Light-Weight Passenger Cars for Railroad Service (P)	Jn 9
Nebesar, Robert J.	Transatlantic Airplane Design Problems	Jl 27
Neely, George L.	Oil, Bearings and Pistons	Jn 24
Neely, George L.	Recent Developments in Diesel Engine Lubricating Oils	Jl 33
Nelson, Arvid	Propeller Production	No 13
Newell, J. S.	Stress Analysis of Leading-Edge Wing Spars	Ap 22
Newton, Gaylord W.	A Survey of Mechanical Failures of Aircraft During 1936 and 1937	Mr 26
North, J. R.	Selection of Truck Chassis for Public Utility Use	Fe 49
Nutt, Arthur	Aircraft-Engine Development Progress	Jl 26, Jl 48, Jl (Sec. 2) 11
Nutt, Arthur	European Air Forces	My 15
Olsen, Oscar F.	The Application of Electrical Equipment to Aircraft	Ap 12
Page, George A., Jr.	New Transport Plane	Ap 30
Page, George A., Jr.	Transport Airplane Development	Ap 28
Parke, Peter	Streamlined Train Development	De 14
Parsons, Carl	What's It All About?	De 22
Paul, W. H.	Forced Induction for Automotive Vehicles	Ap 29; No 34
Perkins, Kendall	High Flight Engineering	My 28
Powelson, J. J., and J. F. Winchester	Safety Lane Testing	Fe 32
Probst, Jack	Operating Economy and Weight Reduction	Jl 49
Prutton, C. F., and A. O. Willey	Hypoid Lubricants	De 10
Pulsifer, Verne	Bearings	Jl 52
Pyne, F. C.	Ten Years' Service Experience with Alclad Materials in Aircraft	Mr 24
Ragsdale, E. J. W.	Some Engineering Problems of Light-Weight Construction	Jl 29; (P) Ag 9
Ragsdale, E. J. W.	The Inside Story of a Weld	De 16
Ragsdale, LaVerne B.	Front Wheel Suspension	Jl 48
Ramsaur, W. R., and F. M. Young	Methods of Oil-Temperature Control	Mr 24
Rassweiler, G. M.; Lloyd Withrow and Walter Cornelius	Flame Propagation and Pressure Development	Ap 30

AUTHOR INDEX

AUTHOR	TITLE OF PAPER	PAGE
Raymond, Arthur E.	Some Factors Affecting the Cost of Manufacture and Operation of Large Airplanes	Jl (Sec. 2) 10
Reed, Albert C.	DC-4 Flight Tests	Ap 28
Reeves, Alfred	Engineers and Industry	Jl 15
Rendel, T. B.	Aircraft Fuels	Oc 26
Rendel, T. B.	Keeping Up to Date in Motor Fuels	Fe 39
Rendel, T. B., and L. E. Hebl	Spark Timing and Its Relation to Road Octane Numbers and Engine Performance	Fe 34
Rhodes, Joe	Machine Shop Practice in Reconditioning Automotive Equipment	Oc 26
Rhines, T. B.	The Choice of Operating Speeds for Propellers of Limited Diameter	Fe 30
Ricart, W. P., and Sandro Sirtori	Some European Comments on High-Output Automobile and Aero Engines	Jl 23
Richardson, R. W.; F. L. Miller and J. F. Kunc, Jr.	Laboratory Tests as a Means of Evaluating Performance of Lubricants	Jl 39
Risk, Thomas H.	Keeping Up to Date in Motor Fuels	Fe 39
Ritchie, P. C.	The Multi-Fuel Engine	De 10
Roberts, E. A.	Designing the Tire for the Car	Fe 26
Roberts, W. A., and W. H. Yenni	Instrumentation for Maintenance and Test Procedure of Electrical Equipment	Oc 25
Robertson, A. F.; R. A. Rose and G. C. Wilson	Duration of Combustion in a Commercial Diesel Engine	Fe 37
Roensch, Max M.	New Engine Developments	De 25
Roensch, Max M.	Piston-Ring Coatings and Their Effect on Ring and Bore Wear	Jl (Sec. 2) 17
Roos, D. G.	Automobile Racing	Jl 42
Roper, Val J.	Sealed Beam Lighting	No 27
Roper, Val J., and K. D. Scott	Silhouette Seeing with Motor Car Headlamps	De 22
Rose, R. A.; A. F. Robertson and G. C. Wilson	Duration of Combustion in a Commercial Diesel Engine	Fe 37
Rossman, Peter F.	Application of Automotive Production Methods to Aircraft Manufacture	Jn 23
Rowley, Robert E.	Engineered Automotive Operation and Maintenance	Jl (Sec. 2) 6
Ruebensaal, C. F.	Better Finishes for the Automotive Industry through Electrochemistry	Jl 52
Ryder, F. A., and C. J. Vogt	Automotive Research at the University of California	No 33
Sabina, J. R.	Controlling the Deterioration of Crankcase Lubricating Oils in Service	Jl (Sec. 2) 17
Schlink, F. J.	The 1940 Passenger Cars from the Consumers' Viewpoint	No 24
Schmeltzer, John E.	The Diesel Motorship	Ap 26
Schmidt, Henry	The Radio Compass	Jl 52
Schwartz, H. A.	Malleables and Steel Castings	De 23
Schwedes, H. F.	The Final Assembly of Aircraft	No 15
Scott, K. D., and Val J. Roper	Silhouette Seeing with Motor Car Headlamps	De 22
Sharkey, W. R.	Motor Vehicle Regulation	Fe 48
Shaw, S. B.	Overhead	No 32
Sheahan, B. W.	New Method of Developing Prototype Airplanes as Applied to Consolidated Aircraft Corporation's Model 31	No 16
Shidle, Norman G.	Progress in the Automotive Industry	Jn 21
Shidle, Norman G.	Truck Factors in Upbuilding Industry and Commerce	Jl (Sec. 2) 7
Shoemaker, F. G.	Two-Cycle Diesel Engines	Jn 21; Fe 39; My 24
Sibley, B. E.	The Development of Lubricants	Jl 51
Sikorsky, Igor I.	Future Transoceanic Airliners	Ap 28
Sirtori, Sandro, and W. P. Ricart	Some European Comments on High-Output Automobile and Aero Engines	Jl 23
Sloman, C. M.; S. M. Cadwell, R. A. Merrill and F. L. Yost	Dynamic Fatigue Life of Rubber	No 30
Smart, C. F.	Bearing Materials, Manufacturing Practices and Failures	Jn 28
Smith, F. Ll., and E. W. Hives	High-Output Aircraft Engines	Jl 24
Smith, Philip H.	Your Society - Finances	(P) Mr 7
Smith, Philip H.	Your Society - Meetings	(P) Oc 17
Smith, Philip H.	Your Society - Publications	(P) My 13
Snead, J. L. S.	Truck Maintenance Problems	Fe 48
Spannhake, W.	Hydrodynamic Power Transmission for Motor Cars	Jl 17
Staley, Allen C.	Temperature Sensations in Automobile Bodies	My 28
Stansfield, R., and H. B. Taylor	A New Laboratory Method for Rating Aviation Fuels for High Octane Number	Jl 41
Steele, Henry	Maintenance of Airplanes	Je 16
Stenberg, T. R., and C. N. Menz	Brake Lining Testing Machines and Methods	De 22

S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

AUTHOR	TITLE OF PAPER	PAGE
Stewart, J. P., and B. W. Story	Engine Deposits, Field and Laboratory	Jl 38
Story, B. W., and J. P. Stewart	Engine Deposits, Field and Laboratory	Jl 38
Stout, William B.	Romance of Engineering	My 22
Stout, William B.	What Motor Cars Can Be	Mr 9
Stromme, Major J. L.	Military Value of Commercial Aviation	Ap 25; No 34
Swigert, A. M., Jr., and David A. Wallace	Superfinish	No 22
Tanberg, M. O.	The Application of Butane-Propane Mixtures as Fuel for Internal Combustion Engines	Mr 9; No 33
Taub, Alex	What About the Engine	Jn 24
Taylor, H. B., and R. Stansfield	A New Laboratory Method for Rating Aviation Fuels for High Octane Number	Jl 41
Thee, Major Walter C.	Army Lighting Problems and Developments	De 22
Tiffin, W. T., and Ottie Eads	Metal Cutting Tests Using Butane, Propane and Acetylene	De 13
Tomlinson, D. W.	High-Altitude Flying Observations	Jl (Sec. 2) 9
Tomlinson, D. W.	Sub-Stratosphere Flying	Fe 14
Touceda, Enrique, and J. H. Lansing	Developments in Malleable-Iron Practice and Their Automotive Applications	Jl 44
Towers, Captain John	Mutual Problems of Military and Civil Aviation in the Field of Air Transportation	Fe 20
Towle, H. Ledyard	Glitter Points	My 25
Treiber, O. D.	Diesel Applications in America and Europe	Fe 48
Trimble, H. M.; R. C. Alden and M. G. Blair	Vaporization Characteristics of Current Winter Motor Fuels	De 10
Tsien, H. C.	Basic Problems in Design of High-Output Aircraft Engines	Jn 22; Oc 26
Tuttle, S. B.	Diesels	My 16
Underwood, A. F.	Bearing Wear	Ap 28
Van Deventer, John H.	The Economic Outlook	My 28
Veal, C. B.	Manly, the Engineer	Fe 32
Veal, C. B.	S.A.E., A Cooperative Community	Mr 23
Vedovell, R. J.	Developed Methods Recommended for Sealing Dirt, Grease and Oil	No 23
Verbarg, L. J.	Air Conditioning in Buses, Railcars, and Coaches	Mr 22
Vincent, E. T.	Symposium on Piston Temperatures	Fe 36
Vogt, C. J., and F. A. Ryder	Automotive Research at the University of California	No 33
Von Philippovich, A.	Evaluation of the Fuel Test and Proposals for Its Formulation	Jl 41
Walker, A. R.	The Role of the Diesel on Rails	Jl (Sec. 2) 16
Wallace, David A.	Superfinish	Ap 25; My 16
Wallace, David A., and A. M. Swigert, Jr.	Superfinish	No 22
Wallace, E. H.	The Manufacture of Rubber Products	Jn 26
Warner, E. P.	The Government's Responsibility in Aviation Research	Ag 14
Webber, H. M.	Economy of Electric-Furnace Brazing	De 26
Weber, E. F.	Diesel Power in High-Speed Railroad Service	Mr 22
Weems, Com. P. H. V.	Air Navigation	My 22
Weick, F. E.	Composite Wood and Plastic Propeller Blades	Fe 29; No 31
Wells, Edward C., and E. Gifford Emery	Giant Transoceanic Seaplanes	Jl (Sec. 2) 10
Welty, G. D.	Aluminum - Its History, Its Present and Future Place in Industry	No 22
Wenzinger, Carl J.	A Summary of N.A.C.A. Investigations of High-Lift Devices	Fe 28
Werner, Ralph M.	Why We Build Our Own Vehicles	De 26
Wesson, Major Gen. C. M.	Automotive Ordnance	Fe 20
Wheatley, G. L.	Oil Industry Automotive Maintenance Problems	Mr 23
Whitmer, V. W.	Stainless Steel for Aircraft	Mr 24
Willey, A. O., and C. F. Prutton	Hypoid Lubricants	De 10
Willi, Albert B.	Engine Bearings - From Design to Maintenance	Jl (Sec. 2) 8
Williams, C. G., and H. Ludicke	The Wear of Crankshafts with "Lead-Bronze" Bearings	Jl (Sec. 2) 19
Williams, J. G.	Engine Indication with the Cathode Ray Oscillograph	Fe 37
Williams, L. W.	The Oil Filter's Contribution to the Tractor Industry	No 12
Williams, Sidney J.	Compulsory Vehicle Inspection from the Safety Viewpoint	Fe 33
Wilson, E. E., and Paul Huber	Passenger Car Road Noise	Fe 27
Wilson, G. W.	Diesel-Electric Bus Drives	Oc 25
Wilson, G. C.; A. F. Robertson and R. A. Rose	Duration of Combustion in a Commercial Diesel Engine	Fe 37
Winchester, J. F., and J. J. Powelson	Safety Lane Testing	Fe 32

AUTHOR INDEX

AUTHOR	TITLE OF PAPER	PAGE
Winning, W. C., and F. L. Miller	Some Factors Affecting Wear in Heavy-Duty Engines	No 22
Winslow, Charles A.	Modern Methods of Conditioning Lubricating Oil	No 12
Winther, Martin	New Methods of Power Transmission	Ap 29
Withrow, Lloyd; G. M. Rassweiler and Walter Cornelius	Flame Propagation and Pressure Development	Ap 30
Wolf, Austin M.	Filtering Fallacies	Fe 33; Ap 24
Wolf, Austin M.	Trends in Design of 1939 Cars	Jn 21, Jn 24, Jn 27
Woollen, A. H.; Frank Jardine and D. S. Mussey	Light-Weight Transportation Units	Jl 30
Worthington, W. H.	Air Cleaner Test Code	No 23
Wright, Robert E.	The Amazing Possibilities of the Rocket Motor	Jl 49
Wright, T. P.	Aircraft Production Methods Compared	No 28
Wright, T. P.	European Aircraft	Fe 38
Yates, B. A.	Recent Developments in Piston-Ring Materials	Je 16
Yenni, W. H., and W. A. Roberts	Instrumentation for Maintenance and Test Procedure of Electrical Equipment	Oc 25
Young, F. M.	Temperature Control of Oil Used as a Lubricant and Internal Coolant	No 22
Young, F. M.	What the Student Branch Can Do for the Society	My 27
Young, F. M., and W. R. Ramsaur	Methods of Oil-Temperature Control	Mr 24
Young, V. C.	Aircraft-Engine Valve Mechanisms	Fe 32
Yost, F. L.; S. M. Cadwell, R. A. Merrill and C. M. Sloman	Dynamic Fatigue Life of Rubber	No 30
Yount, Brig. Gen. Barton K.	Trends in Military Equipment	De 14
Zeder, Fred M.	Engineers in the Modern World	Jl (Sec. 2) 4
Zucrow, Maurice J.	Engine Lubrication Under Cold Weather Conditions	Jn 22; Oc 26
Zucrow, Maurice J.	Engine Operation in Cold Weather	Jn 24

Subject Index

A	PAGE	PAGE	PAGE
Accidents and Accident Prevention		Aeronautical Chamber of Commerce of America	Je 14; No 20
Aircraft		Air Cleaners	
Accessories	Mr 26	Test code, proposed	No 23
Dubl-Chek visual indicator	Mr 26; Ap 30	Tractor	No 23
Factors involved	Mr 26		
Failure causes	Mr 26	Aircraft Design and Construction	
Fire hazards	Ap 21	Accessories	
High-lift devices	Fe 28	Drives	
Improvements suggested	Mr 26	Problems involved	Ap 12
Progress	Mr 26	Types	Ap 12
Safety increase	Je 15	Power transmission methods	
Automobile		Electric	Ap 12
Design effects		Hydraulic	Ap 12
Frameless construction	Jl 17	Acrodynamics	Fe 28, Fe 29; Ap 10, Ap 22; De 14
Headlighting	Se 14, Se 15	Alclad materials used in	Mr 24
Visibility	Jn 21	Altitude effects	Jl (Sec. 2) 9
Windshields	No 24	Boundary layer control	Fe 28
Progress	Jn 24	Cabins, pressure	Ap 28, Ap 30; Jl (Sec. 2) 9, 10
Speed factor	No 25	Composite type	
Improvements predicted	No 26	Cost factor	Jl 26
Inspection, compulsory, as preventive	Fe 32, Fe 33	Merits	Jl 26
Motorcoach inspection, compulsory	Fe 32, Fe 33	Nature of	Jl 26
Motor-truck		Reasons for development	Jl 26
Accident decrease	Jl (Sec. 2) 7, 8	Separation of components	Jl 26
Preventives		Coordination, design and production	Mr 26
Driver training	Jl (Sec. 2) 7	Design requirements	Jl 27
Inspection, compulsory	Fe 32, Fe 33	Duramold used in	Jl 28; Oc 12
Motor Vehicle Inspection Code	Se 24	Electrical equipment	
Preventives		Frequencies	Ap 12
Driver training	Jl (Sec. 2) 7	Future predicted	Ap 12
Vehicle inspection, compulsory	Fe 32, Fe 33	Phases	Ap 12
Progress	Jn 24; Mr 26; Je 15; Jl 15, Jl (Sec. 2) 7, 8	Problems	Ap 12
Railroads	Jn 10, Jn 11	Reliability factor	Ap 12
Road factor	No 26	Vibration effects	Ap 12
S.A.E. cooperation	Fe 33; Jl 51	Weight	Ap 12
Speed factor	Fe 48		
Tire industry's cooperation	Fe 33		
Traffic control factor	Fe 47, Fe 48		

Abbreviations Used:

January, Jn
February, Fe
March, Mr

April, Ap
May, My
June, Je

Months of the year

July, Jl
August, Ag
September, Se

October, Oc
November, No
December, De

S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

Aircraft Design and Construction (Continued)

	PAGE
Engine mounting	
Dynamic suspensions	
Merits	Fe 31, Fe 32
Vibration affected by	Fe 32
Types of	Fe 32
Experimental engineering	No 16
Flying boat	
Requirements	Jl (Sec. 2) 10
Size	Jl (Sec. 2) 10
Trends	Jl (Sec. 2) 10
Weight	Jl (Sec. 2) 10
Fuel tanks, magnesium	Jl 27
Future predicted	Fe 20; No 26
Hydraulic system	
Design problems	No 14
High pressure	
Advantages	No 14
Definition	No 14
Pump problems	No 14
Weight saving	No 14
Temperature factor	No 14
Shop problems	No 14
Improvements cited	Fe 20
Industrial engineering relation to	Mr 26
Landing gear, tricycle	Ap 28
Landplanes and seaplanes compared	Jl 27
Magnesium used in	Jl 29; Se 18; No 22, No 29
Makes	
Boeing	Jl 27
Consolidated	No 16
Curtiss-Wright	Mr 26
Douglas	Ap 25; No 14
Vultee	No 16
Military	Fe 17, Fe 20; De 14
"Pick-a-back"	Jl 26
Plastics used in	Fe 29; Jl 28; No 31
Privately owned	Fe 28; My 22
Production	
Automobile methods compared with	Jn 23
Coordination, design and production	Mr 26
Cost factor	No 16
Final assembly	No 15
Foreign data	No 28
Future predicted	Jn 23; No 28
Increase predicted	No 28
Interchangeability	No 15
Loft board method	No 16
Methods compared, old and new	Jn 23
Methods, domestic and European	No 28
Prototype development	No 16
Riveting	
Cost reduction	Ap 10
Flush riveting	Ap 10
Problems involved	Ap 10
Tooling requirements	Jn 23
War effects	No 28
Progress	De 14
Propellers	
Blades	
"Compreg" used in	Fe 29
Design described	Fe 29
Light-weight	Fe 29
Material used in	Fe 29; No 22, No 31
Schwarz process	Fe 29
Constant-speed and feathering compared	Ap 20
Controllable	My 28
Feathering	
Constant-speed compared with	Ap 20
Merits	Ap 20, Ap 21
Future predicted	My 28
Gear ratio	Fe 30
Hydromatic	No 13, No 26
Makes, Hamilton	Jl 25
Material used	Fe 29; No 22, No 31
Problems	My 28
Reduction gearing	
Flexibility	Jl 26
Vibration affected by	Jl 26
Submerged-engine-installation problems	No 21
Thrust	Fe 30
Tip-speed losses	Fe 30, Fe 31
Vibration research	Jl 25, Jl 26
Weight importance	No 31
Whirling tests	Fe 30, Fe 31
Prototype development	No 16
Reynolds Number	Fe 28

Aircraft Design and Construction (Concluded)

	PAGE
Seaplanes and landplanes compared	Jl 27
Size	
Cost factor	Jl (Sec. 2) 10
Large type merits	Jl (Sec. 2) 10
Seaplane and landplane compared	Jl 27
Trends	No 26
Types compared	Jl (Sec. 2) 10
Speed increase, importance of	No 28
Steel, stainless	Mr 24
Testing, wind tunnel	Ap 22
Trends	Fe 20; De 14
Weight	
Gross	Jl (Sec. 2) 10
Reduction important	No 28
Trends	De 14
Wind tunnels, turbulence trends	Ap 22
Wings	
Beam stress calculations	Ap 22
Buckling	Ap 22
Flaps	
Deflector-plate	Fe 29
Lift affected by	Fe 28, Fe 29
N.A.C.A. type	Fe 28, Fe 29
Slotted	Fe 28, Fe 29
Fuel tanks located in	Jl 27, Jl 28
High-lift devices	
Factors involved	Fe 28
Importance	Fe 28
Location	Fe 28
N.A.C.A. research	Fe 28
Privately-owned airplanes improved by	Fe 28
Safety affected by	Fe 28
Passengers accommodated in	Jl 27
Shear stresses	Ap 22
Spars, leading-edge	Ap 22
Stress analysis	Ap 22
Surface roughness	
Drag affected by	Ap 10
Performance affected by	Ap 10
(See also Accidents and Accident Prevention, Aircraft; Aircraft Operation and Performance; Aviation; Engines, Aircraft; Instruments; and Materials)	

Aircraft Operation and Performance

	PAGE
Accessories	
Definition	Mr 26
Future predicted	Mr 26
Merits	Mr 26
Altitude effects	
Cost factors	Jl (Sec. 2) 9
Design factors	Jl (Sec. 2) 9
Ice formation	Jl (Sec. 2) 10
Levels	Jl (Sec. 2) 9
Substratospheric advantages	My 28
Trends	Jl (Sec. 2) 9
Bombing from substratosphere	Ap 25
Composite type	Jl 26
CW-20	
Description	Ap 28, Ap 30
Merits	Ap 28, Ap 30
Cruising-flight control	Fe 31
DC-4	
DC-3 compared with	Ap 28
Landing gear, tricycle	Ap 28
Merits	Ap 28
Operating costs	Ap 28
Drag	
Interference effects	Ap 10
Testing	Ap 10
Wing	Fe 29; Ap 10
Efficiency, parameter method to improve	Fe 31
Fire-hazard test-program	Ap 21
Flying boat	
Airplane compared with	Jl (Sec. 2) 11
Fuel storage in main hull	Jl (Sec. 2) 11
Future predicted	Ap 28
Landing	Jl (Sec. 2) 11
Future predicted	Fe 14; Ap 28
Ground lights	My 25
Ice formation, prevention of	Fe 31
Instrument flying	De 25
Landing	
Flap effects	Fe 28
Instrument	My 24
Landing gear effects	Ap 28

SUBJECT INDEX

	PAGE		PAGE
Aircraft Operation and Performance (Concluded)		American Society for Metals	Jn 28; No 29
Maintenance		American Society for Testing Materials	Ap 30; My 22, My 23; Je 14; Jl 41, Jl 50; Se 25; De 23
Metal cleaning	No 31; De 13	American Society of Civil Engineers	Se 24
Overhaul periods	No 26	American Society of Heating and Ventilating Engineers	Fe 28; Oc 25
Problems	Fe 20	American Society of Mechanical Engineers	Se 24; No 30, No 33; De 23
Makes		American Standards Association	Je 14; Jl 42, Jl 50, Jl 51; Ag 15; Se 24; No 30
Boeing	Jl (Sec. 2) 10, 11	Army	
Curtiss-Wright	Ap 28, Ap 30	Air Corps	Fe 18, Fe 20; Mr 26; Jl 26, Jl 41
Douglas	Ap 28; Jl (Sec. 2) 9, 10	Aircraft standards	Je 14
Northrup	Jl (Sec. 2) 9	Automotive equipment	My 16
Military	Fe 20	American and European compared	My 16
Payload	Jl 26	Four-wheel drive merits	My 16
"Pick-a-back"	Jl 26	Metals needed	Fe 17, Fe 18, Fe 19, Fe 20
Pilot training, Purdue University	De 23	Automotive problems	Fe 18, Fe 19, Fe 20
Privately owned	Fe 28	Ordnance Department	Fe 18, Fe 19, Fe 20
Progress	Fe 14	Quartermaster Corps	Fe 18, Fe 19, Fe 20
Propellers		Screw-thread standardization	No 30
Efficiency		Vehicle maintenance methods	No 32
Factors affecting	Fe 29	Automobile Design and Construction	
Material effects	Fe 29, Fe 30	Accessibility factor	Jn 24
Speed	Fe 30	Air conditioning	Ap 29; Oc 25; No 33, No 34
Vibration		Appearance	Jn 24, Jn 25
Blade material effects	Jl 26	Body and chassis unit construction	Jl 16, Jl 17, Jl 21, Jl 45
Factors affecting	Jl 25	Consumer opinion summarized	No 24, No 25
Sources of	Jl 25, Jl 26	Criticisms	De 23
Strain-gage use	Jl 26	Engineering organization	
Radio beam, static immune	My 24	Cooperation with other departments	Fe 38
Safety factors	Mr 26	Factors influencing	Fe 38
Safety, increase in	Je 15	Frameless design	
Size		Conventional compared with	Jl 16
Cost factor	Jl (Sec. 2) 10	Customer attitude	Jl 17
Large-type merits	Jl (Sec. 2) 10	Definition	Jl 16, Jl 17
Types compared	Jl (Sec. 2) 10	Design effects	Jl 17
Speed, landing, wing flap effects	Fe 28, Fe 29	Merits	Jl 16, Jl 17
Substratosphere		Safety effects	Jl 17
Altitude limit	Fe 14	Tunnels	Jl 17
Bombing from	Ap 25	Future predicted	Jn 21; Mr 9; Jl 45
Future predicted	My 28	Gadgets, decrease in	Jn 21
Oxygen usage	Ap 25	Heating	Ap 29
Take-off		Improvements needed	Jn 21; Jl 45; No 24, No 25
Assisted take-off types	Jl 26	Light cars, European	
Composite aircraft	Jl 26	Description	Jl 18
Flap effects	Fe 28	Domestic compared with	Jl 18, Jl 19, Jl 20
Testing		Merits	Jl 18, Jl 19
Drag	Ap 10	Streamlining	Jl 18
Flight		Taxation related to	Jl 18
Cost factor	Jl 28	Types	Jl 18
Flutter	Jl 28	Weight reduction	Jl 18
Insurance rate increase	Jl 28	Makes	
Least-hazard principle	Jl 28	Alfa Romeo	Jl 19
Personnel	Jl 28	Austin	Jl 19
Torque meter usage	Ap 20	Buick	Jn 25
Transoceanic	Ap 28; Jl 27, Jl (Sec. 2) 10	Bugatti	Jl 19
Vibration		Chevrolet	Jn 24; Fe 25, Fe 38
Engine effects	Jl 25	Chrysler	Ap 26
Factors affecting	Jl 25	Citroen	Jl 18
Propeller	Jl 25	Crosley	Jl 50
Sources	Jl 25, Jl 26	Fiat	Jl 19
Wings		Ford	Jn 24; No 24
Drag, flap effects	Fe 29	Lincoln	Jl 17
Lift		Oldsmobile	De 16, De 26
Devices to increase	Fe 28, Fe 29	Peugeot	Jl 18
Flap effects	Fe 28, Fe 29	Plymouth	Jn 24
Loads		Renault	Jl 18
Composite aircraft	Jl 26	Simca	Jl 18
Trends	Jl 26	Stout Club Car	Se 21
(See also Accidents and Accident Prevention, Aircraft; Aircraft Design and Construction; Aviation; Engines, Aircraft; and Instruments)		Vauxhall	Jn 24
Air Transport Association of America	Je 14; Ag 15	Progress	Jl 45, Jl (Sec. 2) 17; De 23
Aluminum and Aluminum Alloys		Streamlining	Mr 9
Aircraft use of	Mr 24	Trends	Jn 21, Jn 24, Jn 25, Jn 26, Jn 27; Mr 9; Jl (Sec. 2) 17; De 26
Alclad	Mr 24	Weight	
Beryllium alloys	No 22	Frameless construction effects	Jl 16, Jl 17
Cleaning problem	No 31	Reduction affecting cost	Mr 9
Corrosion	Jn 11, Jn 12	Trends	Jl 18, Jl 45
Future predicted	No 22	Windshield, Polaroid	Ap 26
History	No 22	(See also Accidents and Accident Prevention, Automobile; Automobile Operation and Performance; Axles; Bodies; Brakes; Clutches; Engine Design and Construction; Foreign Design and Operation; Headlighting; Production; Springs, Suspension; Tires and Rims; and Transmissions)	
Magnesium compared with	Se 10		
Motorcoach use of	Jl 30		
Steel compared with	Jn 11; Jl 30; Ag 11		
Weight reduction means	Jl 30		
American Association of Motor Vehicle Administrators	Se 14		
American Petroleum Institute	Je 14		

S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

Automobile Operation and Performance

Air conditioning	Ap 29
Car control	
Blowouts	Fe 26
Braking	Fe 26
Speed	Fe 26
Steering	Fe 26
Tire leakage	Fe 26
Heating	Ap 29
Humidity effects	Ap 29
Maintenance	
Machine shop relation to	Jn 27; Oc 26
Metal cleaning	No 31; De 13
Parts salvage	Oc 26
Reconditioning	Oc 26
Noise	
Friction break-away relation to	Fe 27
Measurement	
Decibel scale	Fe 27
Tolerance	Fe 27
Reduction	
Means suggested	Fe 27
Sound-damping materials	Fe 27
Sources	Fe 27
Tire	Fe 27
Roadability	De 23
Stability	
Driver relation to	Jl 20
Tire effects	Jl 20
Testing	
Need for	Jn 21
Proving ground	
Advantages	No 23, No 26
Cost data	No 26
Road testing compared with	No 23
Safety factor	No 23, No 26
Road	
Cost	Jl 32
Driver fatigue	Jl 33
Gasoline mileage	Jl 32
Massachusetts Institute of Technology results	De 23
Oil consumption	Jl 32
Proving ground testing compared with	No 23
Scope of test	Jl 32
Windshield, Polaroid, effects	Ap 26
(See also Accidents and Accident Prevention, Automobile; Automobile Design and Construction; Axles; Bodies; Brakes; Clutches; Engine Operation and Performance; Fleet Operation; Lubricants and Lubrication; Springs, Suspension; Tires and Rims; and Transmissions)	

Automotive Industry

Consumer opinion summarized	No 24, No 25
Engineer-managed	Jl 15
National Defense relation to	Fe 17
Outlook for	Jn 21
Pacific Coast	
East compared with	Jl (Sec. 2) 2, 3
Statistics	Jl (Sec. 2) 2, 3
Policies, consumer criticism of	No 25
Progress	Fe 13; Jl 45
Science, influence of	Jn 21
Social responsibilities	Jn 21

Automotive Safety Foundation

Jl 15

Aviation

Aircraft production increase needed	Fe 32
Army, aircraft production key to victory	No 13
Canadian	My 15; De 24
Commercial	
Altitude	Jl (Sec. 2) 9
Flying boat	Ap 28; Jl (Sec. 2) 10
Future predicted	Je 15
Improvements needed	Ap 9
Military value of	Ap 25; No 34
Passenger transport	Je 15; Jl 27, Jl (Sec. 2) 10
Progress	Ap 9, Ap 26; Je 15
Radio progress	Je 15
Safety increase	Je 15
Transoceanic	Ap 28; Jl 27, Jl (Sec. 2) 10
European	Ap 9; My 15
Experimental engineering, importance of	No 16
Failures, mechanical, survey of	Mr 26
Foreign and domestic compared	Jl (Sec. 2) 10
History	Fe 32

Aviation (Concluded)

Instrument flying	De 25
Loss prevention	Mr 26
Military	Jl (Sec. 2) 11
National Defense relation to	Fe 17
Navigation, Weems System of	My 22
Pacific Coast	
East compared with	Jl (Sec. 2) 2, 3
Statistics	Jl (Sec. 2) 2, 3
Private airplane, importance of	My 22
Progress	Fe 14; Je 15; No 26; De 24
Research contribution to	Je 15
Research, Government responsibility in	Ag 14
Safety	Mr 26; Je 15
South American	Ap 9
Transoceanic	Ap 28; Jl 27, Jl (Sec. 2) 10
(See also Accidents and Accident Prevention, Aircraft; Aircraft Design and Construction; Aircraft Operation and Performance; Engines, Aircraft; and Instruments)	

Axles

Motor-truck requirements	De 13
Two-speed	De 13

B

Bearings

Engine	
Failure causes	Jl (Sec. 2) 8
Improvements needed	Jl (Sec. 2) 8
"Poured" type	Jl (Sec. 2) 8
Progress	No 23
Sealing methods	No 23
"Spun" type	Jl (Sec. 2) 8
Wear	
Future predicted	Ap 28
Underwood corrosion test	Ap 28
Lubrication	
Boundary conditions	Jl 42
Oil oxidation testing	Jl 40
Temperature effects	Jl (Sec. 2) 8, 9
Metal	
Aluminum	Jl 24
Aluminum-tin	Jl (Sec. 2) 9
Babbitt	
Lead, high	Jl (Sec. 2) 8
Tin-base	Jl (Sec. 2) 8
Cadmium	Jl (Sec. 2) 8, 9
Copper-lead	Jl (Sec. 2) 8, 19
Hardness	Jl 42
Lead-bronze	Jl (Sec. 2) 19
Tin	Jl 24
Progress	Jn 28
Shells	Jl (Sec. 2) 9
Temperature problems	Jl (Sec. 2) 8, 9
Wear	Ap 28; Jl (Sec. 2) 19

Bodies

Air conditioning	
Definition	Oc 25
Factors involved	Mr 22; Ap 29; No 33
Future predicted	Fe 28
Motorcoach use of	Fe 28
Problems	Fe 28; Oc 25
Progress	Fe 28
Requirements	My 28
Trends	Fe 28
Types of	Fe 28; Mr 22
Weight of equipment	Fe 28
Appearance	Jn 24, Jn 25; Jl 18, Jl 23
Bumpers	Jl 22
Chassis unit construction with	Jl 16, Jl 17, Jl 21, Jl 45
Consumer criticism of	No 25
Cooling	Ap 29; My 28; No 34
Doors	
Automatic opener	Jl 22
Handles	Jl 22
Hanging of	Jl 22
Fenders	Jl 22
Foreign	Jl 22, Jl 23
Future predicted	Jl 21, Jl 22
Heating	Ap 29; My 28; No 33
History	De 22
Hoods	Jl 22
Humidity effects	Ap 29; No 33
Improvements needed	Jl 45

SUBJECT INDEX

	PAGE		PAGE
Bodies (Concluded)		Carburetors and Carburetion (Concluded)	
Instrument panels		Improvements needed	Jl 45
Glitter points	My 26	Injection compared with	Ap 22
Light reflected from	My 26	Jet location	Fe 31
Suggestions regarding	My 26	Metering	Fe 31
Johnson, Andrew F., contribution to	De 22	Problems	Ap 29
Materials and processes, future	Jl 21, Jl 23	Progress	Jn 23; Fe 31; Ap 29; My 26
Motorcoach		Settings, variations in	Ap 29
Air conditioning	Fe 28	Servicing, precision needed in	Mr 9
Color selection	De 13	"Throttle distribution"	Ap 29
Motor-truck		Civil Aeronautics Authority	Ap 9; Je 14; De 23
Color selection	De 13	Clutches	
Public-utility types		Electric	
Design trends	Fe 49	Development	Ap 29, Ap 30
Materials used	Fe 49	Usage extent	Ap 30
Progress	Fe 49	Progress	Jn 25
Standardization	De 24	Commercial Cars	
Standardization needed	Jl 21, Jl 22	(See Fleet Operation, Motorcoach and Motor-Truck)	
Plastics used in	Jl 23	Cooperative Fuel Research	
Production methods, future predicted	Jl 21	Automotive Diesel fuels	My 23
Progress	Jn 21, Jn 24	Aviation fuels	My 23; Je 14
Running boards		Aviation Fuels Division	Ag 15
Seats		Corrosion projects	My 23
Foamed-latex		Detonation testing	
Conventional compared with	Fe 28	Cooperative Fuel Research Exchange Group	Jl (Sec. 2) 16
Cost factor	Fe 28	Knock characteristics	My 23
Merits	Fe 27, Fe 28	Laboratory Detonation Project	Jl 41
Odor	Fe 28	Shrouded intake valve	Jl (Sec. 2) 17
Future predicted	Jl 23	Knock characteristics, method of testing	My 23
Latex, foamed	Fe 27, Fe 28	Motor-Gasoline Survey	My 26
Location	Jl 23	Motor Survey	My 23
Streamlining	Jl 18; Jl 23	Octane scale, extension of	My 23
Temperature considerations		Reports	Fe 44
Summer	My 28	Corrosion and Corrosion Prevention	
Winter	My 28	Aluminum	Jn 11, Jn 12
Trends	Mr 9	Bearing corrosion tests	
Upholstery	Jl 22	Progress	Jl 40
Variety needed	Jl 21	Standardization needed	Jl 40
Weight, air-conditioning equipment	Fe 28	Magnesium	Jl 29
Windows	Jl 22	Steel	Jn 11, Jn 12
Brakes		Crankcases	
Aircraft		Aircraft engines	No 16
Control	No 13, No 14	Forged steel	No 16
Drum cooling importance	No 14	Ventilation	Mr 11
Installation	No 13, No 14	Crankshafts	
Size factor	No 14	Crankpin wear	
Hydraulic	Jn 25	Factors affecting	Jl (Sec. 2) 19
Linings		Testing	Jl (Sec. 2) 19
Machines used	De 22	Materials	
Testing	De 22	Testing	Jl (Sec. 2) 19
Makes, Lockheed	Jn 25	Wearing properties tested	Jl (Sec. 2) 19
Progress	Jn 25	Vibration	
Railroad	De 14	Aircraft engine	
Testing	Fe 33	Amplitude calculation	Ap 11
British American Engineering Congress	Se 24	Material effects	Ap 11
Bureau of Aeronautics	Mr 26	Problems involved	Ap 11
Bureau of Air Commerce	Mr 26	Torsional	Ap 11
Bureau of Mines	De 10	Wear	
Bureau of Standards	Mr 26; Ap 22; Jl 26	Material effects	Jl (Sec. 2) 19
Bus		Testing	Jl (Sec. 2) 19
(See Motorcoach)		Cylinders	
Carburetors and Carburetion		Blocks, welding problems	Fe 25, Fe 26
Aircraft		Chromium plating	Jl (Sec. 2) 19, 26
Air-fuel mixture ratio		Heads, copper	Fe 38
Control, automatic	Fe 31	Size	Jl 23, Jl 24
Ice formation affected by	Fe 31	Wear	
Design described	Fe 31	Causes	Jn 22
Ice formation, prevention of	Fe 31	Chromium plating to reduce	Jl (Sec. 2) 19, 26
Progress	Fe 31	Factors affecting	Jl (Sec. 2) 19, 26; De 13
Air-fuel mixture ratio, factors affecting	Fe 31	Lubricant effects	Jl (Sec. 2) 19
Choke, automatic	Ap 29	Material effects	Jl (Sec. 2) 26
Economy increase	Ap 29	Piston ring effects	Jl (Sec. 2) 17, 19, 26
Fuel level control	Fe 31		
Ice formation			
Factors affecting	Mr 10		
Prevention of	Fe 31		

Abbreviations Used:

January, Jn
February, Fe
March, Mr

April, Ap
May, My
June, Je

Months of the year
July, Jl
August, Ag
September, Se

October, Oc
November, No
December, De

S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

	D	PAGE		PAGE
Detonation			Engine Design and Construction (Concluded)	
Altitude effects		Jl (Sec. 2) 16	Multi-fuel type	
Antiknock value, methods of measuring		Oc 26	Field for	De 13
Atmospheric effects, humidity		Jl (Sec. 2) 16	Fuels used	De 10
Carbon deposits		Fe 35	Hesselman-unit conversion	De 10
Engine factors			Lubrication	De 10, De 13
Air-fuel mixture distribution		Fe 35, Fe 36	Merits	De 10, De 13
Compression ratio		Fe 34, Fe 35	Starters	
Ignition timing		Fe 34, Fe 35, Fe 36	Carter Carstarter	Jn 25
Fuel factors			Design described	Jn 25
Distribution		Fe 35, Fe 36	Progress	Jn 25
Octane number requirements		Fe 34, Fe 35, Fe 36	Taxation influence on	Jn 24
Physiological factor		Fe 35	(See also Bearings; Carburetors and Carburetion; Crankshafts; Cylinders;	
Psychological factor		Fe 35	Detonation; Engine Operation and Performance; Engines,	
Research suggested		Fe 34	Aircraft; Engines, Diesel; Engines, Marine; Engines, Motor-	
Road octane number variability		Fe 34	coach; Engines, Motor-Truck; Engines, Oil; Engines, Racing;	
Suppressers, Anilol		My 28	Engines, Railcar; Engines, Tractor; Foreign Design and	
Testing			Operation; Fuels; Gasoline; Ignition; Pistons; and Valves and	
Army Air Corps		Jl 41	Valve-Gear)	
Aviation gasoline		Fe 39; Jl 41	Engine Operation and Performance	
CFR engine used		Fe 34	Accessibility factor	Jn 24
Cooperative Fuel Research method			Brake horsepower, piston ring coating effects	De 25
Aviation gasoline		Jl 41	Break-in period	De 25
Change proposed		Jl 41	Cold-weather problems	Jn 22, Jn 24
Knock characteristics		My 23	Combustion	
Laboratory Detonation Project		Jl 41	Flame propagation	Ap 30; Jl (Sec. 2) 16
Engine indicator, optical		Jl (Sec. 2) 16	Research	Ap 30; Jl (Sec. 2) 16
Knock-rating control		Jl (Sec. 2) 16	Turbulence effects	Fe 35; Je 15
Laboratory cooperation		Jl (Sec. 2) 16	Cost, octane number effect	No 27
Reproducibility checking		Jl (Sec. 2) 16	Diesel engine compared with	Fe 37, Fe 39; Mr 17; Jl 31
	E		Engine deposits	
Economics			Factors affecting	Fe 50
Automobile industry, outlook for		My 28	Fuel effects	Fe 50
Consumer movement		No 25	Location	Fe 50
Employment, machine effects		Jl 16	Lubricant effects	Fe 50
Farm mechanization		Jl 29	Types of	"e 50
Humanics		Fe 47	Fuel consumption	
Industry, steps in the growth of		Je 14	Cost factor, octane number effect	No 27
Living standards			Factors affecting	Oc 23
Machine effects		Jl 16; No 11	Improvement needed	Jn 24
Science effects		No 11	Measuring device	Oc 23
Machine age			Octane number effects	No 27
Arguments against		Jl 16	Taxation relation to	Jn 24
Employment affected by		Jl 16	Future predicted	Jn 24
Progress due to		Jl 16	Horsepower rating formula	No 26
Motor transport importance		Jl (Sec. 2) 8	Ignition delay, importance of	Fe 35
Optimism expressed		My 28	Lacquer formation	Jl 39
Personnel management		Fe 47	Lubrication	
Progress, engineers' contribution to		Jl 13, Jl 15, Jl 16	Carbon formation	De 25
Education			Carbon removers, effects of	Je 16
Adult		De 14	Cold-weather problems	Jn 22, Jn 24; Oc 26
Automotive trades		No 26	Deposits	Fe 50; Jl 38, Jl 39
Brooklyn High School of Automotive Trades		No 26	Improvements needed	Jl 39
Definition		De 14	Lacquer formation	Fe 15, Fe 16, Fe 25; Jl 39, Jl (Sec. 2) 17
Peace engendered by		De 14	Oil changing	
S.A.E. as factor in		De 14	Factors affecting	Je 16
Technical writing course, University of Wisconsin		Mr 21	Periods	Je 16
Electric Drive			Oil deterioration	Je 16
Advantages		Oc 25	Oil oxidation	
Diesel engine use of		Jl 31; Oc 25	Control method	Jl (Sec. 2) 17
Disadvantages		Jl 30	Testing	Jl 40, Jl (Sec. 2) 17
Motorcoach use of		Jl 30; Oc 25	Oil performance evaluation	Jl 40
Problems		Oc 25	Oil properties	
Engine Design and Construction			Light vs. heavy	Jn 22
Accessibility factor		Jn 24	Requirements	Jl 40
Clearances, finish effects		Ap 24	Stability	Jl 39
Compression ratio			Oil temperature control	Mr 24
Efficiency relation to		Fe 35	Problem analyzed	Oc 26
Fuel type effects		De 25	Rear-mounting effects	Je 16
Ideal suggested		Fe 35	Sludge formation	Jn 22; Fe 15, Fe 16, Fe 25; Je 16
Power affected by		Fe 34	Temperature effects	Je 16
Temperature affected by		Fe 34	Trends	Jl (Sec. 2) 17
Expansion ratio, efficiency relation to		Fe 35	Varnish	
Future predicted		Jn 24; My 22; Jl 21, Jl 22, Jl (Sec. 2) 17	Cost factor	Fe 25
Horsepower rating formula		No 26	Definition	Fe 15
Ideal type outlined		Jl 31	Factors involved	Fe 16, Fe 25
Makes, Waukesha		Jl 50	Fuel effects	Fe 25
Mounting			Lubricant type effects	Fe 15, Fe 16, Fe 25
Rear			Oil insulation relation to	Fe 25
Future predicted		My 22; Jl 21, Jl 22, Jl (Sec. 2) 17	Piston clearance relation to	Fe 16
Lubrication problems		Je 16	Price-class relation to	Fe 25
Merits		Je 14	Temperature effects	Fe 15, Fe 25
Student debate on		Je 14	Troubles from	Fe 15, Fe 25
Tires affected by		Mr 9	Water deposition	Jn 22
			Wear affected by	Jn 22

SUBJECT INDEX

Engine Operation and Performance (Concluded)

	PAGE
Mounting, rear, lubrication problems	Je 16
Oil engine compared with	Jl 31, Jl 50
Oil filters	
Limitations	Fe 33
Merits	Fe 33
Power, compression-ratio effects	Fe 34
Temperature	
Compression-ratio effects	Fe 34
Wear affected by	Jn 22
Testing	Jn 21
Trends	Jl (Sec. 2) 17
Tune-up	
Chassis dynamometer used	Mr 22
Importance of	Fe 50; Mr 22
Periodic	Fe 50
Turbulence, combustion affected by	Je 15
Wear	
Corrosion effects	Jn 22
Lubrication effects	Jn 22
Temperature effects	Jn 22

(See also Bearings; Carburetors and Carburetion; Crankshafts; Cylinders; Detonation; Engine Design and Construction; Engines, Aircraft; Engines, Diesel; Engines, Marine; Engines, Motorcoach; Engines, Motor-Truck; Engines, Oil; Engines, Racing; Engines, Railcar; Engines, Tractor; Foreign Design and Operation; Fuels; Gasoline; Ignition; Oil Coolers; Oil Filters; Pistons; Superchargers and Supercharging; and Valves and Valve-Gear)

Engineering Institute of Canada

Se 24

Engineers and Engineering

Beau de Rochas, plaque dedicated to	Jl 14
Engineering organization	
Cooperation with other departments	Fe 38
Factors influencing	Fe 38
Heldt, P. M., tribute to	De 16
Importance of	Jl (Sec. 2) 4, 5
Industrial engineering relation to design	Mr 26
Johnson, Andrew F., tribute to	De 22
Obligations	Jl 45
Production engineering relation to design	Mr 26
Value	Jl 13, Jl 14, Jl 15, Jl 16

Engines, Aircraft

Accessory-drive problems	Ap 12
Brake mean effective pressure	Fe 31; Jl 23, Jl 24, Jl 26
Cooling	
Air	
Liquid compared with	Jl 25, Jl 27; No 29
Weight factor	Jl 25
Fin design trends	Jl 27
Liquid	
Advantages	Jl 24
Air-cooled compared with	Jl 25, Jl 27; No 29
Field for	Jl 27
Weight factor	Jl 25
Cost factor, octane number effect	No 27
Cruising-power control	Fe 31
Cylinder measurements	Jl 23, Jl 24
Cylinder types	
In-line	
Cooling	No 29
Power increase	No 16
Progress	No 16
Radial, cooling	No 29
Design problems	Oc 26
Diesel	
Fuel consumption data	Jl 27
Gasoline engine compared with	Ap 22; Jl 27, Jl (Sec. 2) 11
Drag, interference effects	Ap 10
Efficiency, parameter method to improve	Fe 31
European developments	Jl 23, Jl 24, Jl 25
Exhaust gas, recovery of energy from	Jn 23
Flat-type	Jl (Sec. 2) 14
Fuel consumption	
Cost factor, octane number effect	No 27
Data on	Jl 27
Factors affecting	Ap 20
Octane number effects	No 27
Reduction	Ap 20; No 26
Fuel dump chute	No 26
Fuel feeding	
Future predicted	Ap 22
German methods	Ap 21
Injection merits	Ap 22
Methods	Ap 21, Ap 22

Engines, Aircraft (Concluded)

	PAGE
Future predicted	Jl 24, Jl 27, Jl 48
History	Fe 32
Ice formation, prevention of	Fe 31
Improvements needed	Jl 48
Installation, submerged	
Problems involved	No 21
Propeller requirements	No 21
Safety factor	No 21
Speed improvement	No 21
Instrumentation, merits of	Jn 23
Location	
Factors affecting	Jl 24
Future predicted	Jl 24
Lubrication	
Additives	De 14
Air Corps practice	De 14
Compound	De 14
Hopper-type oil sump	De 14
Improvements	No 16
Oil consumption reduced	No 16
Oil flow	No 21
Problems	De 14
Magnesium used in	Se 18, Se 19
Makes	
Junkers	Jl 27
Liberty	Jl 50
Pan American	Jl 27
Rolls-Royce	Jl 24; No 29
Military	Fe 20; De 14
Mounting	
Dynamic suspensions	
Merits	Fe 31, Fe 32
Vibration affected by	Fe 32
Types of	Fe 32
Piston speeds	Jn 23
Power	
Cooling type effects	Jl 24
Factors involved	Jn 22, Jn 23; Jl 23, Jl 24
Fuel feeding effects	Jn 23
Fuel type effects	Jn 23; Jl 23
Increase	Jn 22, Jn 23; No 16
Trends	Jl 26
Water injection effects	Jl 24
Weight relation to	Jl 23
Production, quantity	
Design relation to	No 16, No 21
Problem analyzed	No 16
Progress	Jl 23, Jl 24, Jl 26, Jl 27, Jl (Sec. 2) 11
Safety fuels	Ap 21; No 27
Sleeve valve	Fe 20; No 16
Starting, safety fuel effects	Ap 21
Stopping, time required for	No 26
Take-off assistance	Jl 26
Testing forms	Se 24
Torque meter	Ap 20
Trends	Jl 26, Jl 27; De 14
Valve mechanisms	Fe 32
Vibration	
Amplitude calculation	Ap 11
Factors affecting	Jl 25
Mounting effects	Fe 32
Problems involved	Ap 11
Reduction	Jl 27
Weight	
Power relation to	Jl 23
Trends	Jl 26
(See also Carburetors and Carburetion; Crankshafts; Cylinders; Detonation; Fuels; Gasoline; Ignition; Pistons; Superchargers and Supercharging; and Valves and Valve-Gear)	
Engines, Diesel	
Combustion	
Duration	Fe 37
Factors affecting	Fe 37
Fuel type effects	Fe 37
Ignition lag	Fe 37
Testing	
Indicator, cathode ray	Fe 37
Results summarized	Fe 37
Cooling, suggestion offered	Fe 37
Cost factor	Fe 39, Fe 48; Jl 31
Foreign usage	Jl 31
Four-cycle and two-cycle compared	Fe 39; Ap 27; My 16
Fuel consumption, fuel type effects	Jl 35, Jl (Sec. 2) 15

S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

	PAGE		PAGE
Engines, Diesel (Concluded)		Engines, Marine (Concluded)	
Fuel feeding		Fuel supply relation to	Ap 26
Air injection	Jl 36	Makes, Busch-Sulzer	No 25
Injectors magnetically operated	Ap 26		
Nozzles	Jl 35	Engines, Motorcoach	
Pressure-wave theory	Jl 35	Lubrication	
Pumps		Oil consumption, ventilation effects	Je 16
Hesselman design	Jl 34	Oil type effects	Je 16
Single-plunge multicylinder	Jl 34	Problems	Mr 11
Research program	Jl 34	Rear-mounting effects	Je 16; No 33
Fuel requirements	Ap 27	Sludge formation	Mr 11; Je 16
Future predicted	Jl 31	Tests	Mr 11
Gasoline engine compared with	Fe 37, Fe 39; Mr 17; Ap 22, Ap 28,	Wear relation to	No 33
Ap 29; Je 19; Jl 27, Jl 31, Jl (Sec. 2) 11, 14, 15; De 24		Mounting, rear	Je 16; No 33
History	Ap 30; Je 19; Jl (Sec. 2) 14; No 34	Wear	
Ignition delay, importance of	Fe 35	Lubricant effects	No 33
Indicators as means of study	Fe 37	Ventilation effects	No 33
Lubrication			
New type developed	Jl 33, Jl 34	Engines, Motor-Truck	
Oil selection	De 12, De 13	Brake mean effective pressure	Fe 38
Oil temperature effects	De 12, De 13	Carbon deposition	
Research program	Jl 33	Metal effects	Fe 38
Service data	Jl 34	Oil type effects	Fe 38
Spreading characteristics	Jl 33, Jl 34	Oil viscosity effects	Fe 38
Viscosity effects	De 12, De 13	Temperature effects	Fe 38
Makes		Cooling, steam	Fe 38
Busch-Sulzer	No 25	Diesel	
Cummins	Fe 48	Cost factor	De 24
General Motors	Jn 21; Fe 39; Ap 28, Ap 29; My 16, My 22	Gasoline engine compared with	Je 19; Jl (Sec. 2) 14; De 24
Marine use of	Jl (Sec. 2) 14	Merits	Jl (Sec. 2) 14
Merits	Jl 31, Jl (Sec. 2) 14	Progress	Je 19
Military factor	Fe 17, Fe 18	Usage, example given	Fe 48
Motorcoach use of	Jl (Sec. 2) 14	Lubrication	
Motor-truck use of	Je 19; Jl (Sec. 2) 14	Oil drainage period	De 12
Noise reduction	Fe 48	Purging compounds	Jl (Sec. 2) 7
Obstacles against use	Jl 31	Wear affected by	De 12, De 13
Oil engine compared with	Jl 31	Oil industry use of	Mr 23
Pacific Coast development of	Jl (Sec. 2) 14	Power increase, purpose of	Fe 38
Performance, fuel properties related to	Jl 36	Wear	
Piston ring sticking overcome	Ap 29	Factors involved	De 12, De 13
Power, fuel type effects	Jl 35, Jl (Sec. 2) 15	Lubrication effects	De 12, De 13
Progress	Fe 48; Ap 30; Je 19; Jl 31, Jl (Sec. 2) 14		
Pump wear	Jl (Sec. 2) 15, 16	Engines, Oil	
Railroad use of	Jl (Sec. 2) 14, 16	Cost factor	Jl 31, Jl 50
Supercharging	Je 19	Design described	Jl 50
Temperature, piston		Fuel consumption	Jl 31
Factors affecting	Fe 36	Fuel feeding	
Fuel effects	Fe 37	Nozzles	Jl 35
Gasoline engine compared with	Fe 37	Pressure-wave theory	Jl 35
Oil gumming relation to	Fe 36	Pumps	
Reduction means	Fe 36, Fe 37	Hesselman design	Jl 34
Ring sticking relation to	Fe 36	Single-plunge multicylinder	Jl 34
Variation	Fe 36	Research program	Jl 34
Varnish formation	Fe 36	Interchangeability	Jl 31
Tractor use of	Jl (Sec. 2) 14	Makes, Hesselman	Fe 35; Jl 31, Jl 50
Two-cycle		Merits	Jl 31, Jl 50
Cooling	Jn 21	Spark ignition	Fe 35
Four-cycle compared with	Fe 39; Ap 27; My 16		
Fuels used	Fe 39	Engines, Racing	
Injection troubles, reduction of	Jn 21	Aircraft	Jl 23
Lubricants used	Fe 39	Automobile	Jl 23
Merits	Jn 21; Ap 28, Ap 29; My 16	Displacement	Jl 23, Jl 24
Miniature, glass	Jn 21	Supercharging	Jl 24
Otto cycle compared with	My 22, My 24		
Scavenging	Jn 21	Engines, Railcar	
Usage extent	Jl 31, Jl (Sec. 2) 14	Diesel	
Wear	Jl 35	Cost	My 28; Jl (Sec. 2) 16
Weight factor	Jl 31	Merits	Mr 22; Ap 30; My 28; Jl (Sec. 2) 16
(See also Cylinders; Detonation; Engines, Aircraft; Engines, Motor-Truck; Fuels; Pistons; and Superchargers and Supercharging)		Progress	De 16
		Steam engine compared with	Ap 30; My 28; Jl (Sec. 2) 16
Engines, Marine		Usage extent	Jl (Sec. 2) 14
Couplings		Weight factor	My 28
Hydraulic	Ap 26	Progress	De 16
Magnetic	Ap 26	Steam and Diesel compared	Ap 30; My 28; Jl (Sec. 2) 16
Mechanical	Ap 26		
Diesel		Engines, Tractor	
Design described	No 25, No 26	Air Cleaner Test Code proposed	No 23
Future predicted	Ap 26	Diesel engine usage	Jl (Sec. 2) 14
Progress	Ap 26, Ap 27	Lubrication	
Reversal		Function	No 23
Automatic	No 26	Oil cooler merits	No 22
Time required for	No 26	Oil deterioration	No 22
Steam competition with	Ap 26	Temperature control	No 22
Two-cycle type	No 25		
Usage extent	Jl (Sec. 2) 14		

SUBJECT INDEX

	PAGE		PAGE
Engines, Tractor (Concluded)		Foreign Design and Operation (Concluded)	
Makes		Automobile	
Hercules	De 10	Bodies	Jl 22, Jl 23
McCormick-Deering	De 10	Domestic compared with	Jl 18, Jl 19, Jl 20
Multi-cylinder	Fe 47	Handling characteristics	Jl 19, Jl 20
Test data	De 10	Light cars	Jl 18, Jl 19
Trends	Fe 47	Production data, France	Jl 18
Wear		Aviation	
Corrosion effects	No 23	Domestic compared with	Fe 38; Ap 9; Jl (Sec. 2) 10
Engine design effects	No 22	England	My 15
Lubricant effects	No 12, No 22, No 23	Fighting force, comparison	Fe 38
Oil filter effects	No 12, No 22	France	My 15
Starting effects	No 23	Germany	Ap 9; My 15
Temperature effects	No 22, No 23	Italy	Ap 9; My 15
		Russia	My 15
		South America	Ap 9
		Trends	My 15
F		British army	
Fleet Operation		Guns, anti-aircraft	Mr 12
Accident reduction	Jl (Sec. 2) 7, 8	Mechanization of transport units	Mr 11, Mr 12
Depreciation	No 33	Engines	
Driver cooperation	De 26	Aircraft	
Factors involved	Mr 23, Mr 24	Diesel	My 15; No 29
Inspection		Domestic compared with	Fe 38
Advantages	Fe 32, Fe 33	Engine types compared	No 29
Compulsory	Fe 32, Fe 33	Diesel	Jc 19; Jl 31
Political factor	Fe 33	Fuel consumption problems	Jn 24
Safety-lane testing		Fuel injection, Germany	Ap 22
Cost factor	Fe 32, Fe 33	Trends	My 15
Factors involved	Fe 32, Fe 33	Magnesium usage	Jl 29; Se 9, Se 19; No 29
Merits	Fe 32, Fe 33	Motor truck, four-wheel drive, Germany	Jn 27
Methods	Fe 33	Production, metals	
Trends	Fe 33	Applications	Se 18, Se 19
Lubrication		Cost factor	Se 9, Se 10
Oil-change periods	Fe 47; No 24	Magnesium	Jl 29; Se 9, Se 19; No 29
Oil selection	Fe 47	Progress	Se 9
Maintenance		Trends	Se 9
Cost reduction	No 33; De 12	Standardization, S.A.E. cooperation	Jc 14
Methods	No 24	Taxation	Jn 24; Jl 18
Preventive	No 24		
Problems	Jl 48; De 12, De 13	Frames	
Motorcoaches	Jn 20	Body unit construction with	Jl 16, Jl 17, Jl 21, Jl 45
Oil-filter usage	Fe 34, Fe 47	Frameless car defined	Jl 16, Jl 17
Oil industry problems	Mr 23		
Overhead	No 32	Fuels	
Problems connected with	My 26; Jl 48	Alcohol, European use of	Fe 40
Public utility		Anilol	
Acceptance tests	Jl (Sec. 2) 7	Composition	My 28
Accident reduction	Jl (Sec. 2) 7	Merits	My 28
Competitive bidding	Jl 32	Aviation	
Cost factor	Jl 32; Jl (Sec. 2) 6; No 23	Detonation, methods of measuring	Oc 26
Driver training	Jl 32; Jl (Sec. 2) 6, 7	Detonation testing	Fe 39
Economy, factors affecting	Jl 32; Jl (Sec. 2) 6	Progress	Jl (Sec. 2) 11, 12
Engineered maintenance	Jl (Sec. 2) 6, 7	Properties desired	Oc 26
Garages	Jl 32; Jl (Sec. 2) 6	Rating	
Highway transport service compared with	Fe 49, Fe 50	Cathode-ray oscillograph used	Jl 41
Maintenance, engineered	Jl (Sec. 2) 6, 7	Laboratory method, new	Jl 41
Maintenance standards needed	Jl 32; Jl (Sec. 2) 6	Safety fuels	
Operating cost data	No 24	Engine design relation to	Ap 21
Passenger car pooling	No 23, No 24	Gasoline compared with	Ap 21
Personal element	Jl (Sec. 2) 5, 7	Heat value	Ap 21
Personnel requirements	Jl 32; Jl (Sec. 2) 6	Problems connected with use of	Ap 21; No 27
Problems	Mr 23; Jl 32, Jl (Sec. 2) 6	Prospects for use of	Ap 21; No 27
Tires	Jl 32; Jl (Sec. 2) 6	Requirements	Ap 21
Truck chassis selection	Fe 50	Starting requirements	Ap 21
Weight trends	Fe 50	Types of	Ap 21; No 27
Public Utility Fleet Supervisors	De 13	Use of	
Tires		Prospects for	Ap 21; No 27
Recapping	De 12	Problems involved	Ap 21; No 27
Retreading	De 12	Standardization trends	Fe 39; Ag 15
Trends	Jl 32; Jl (Sec. 2) 6	Butane	
(See also Motorcoach Operation and Performance; Motor-Truck Operation and Performance; and Tires and Rims)		Cost factor	Mr 9
		Gasoline compared with	Mr 9
Foreign Design and Operation		Merits	Mr 9; No 33
Aircraft production		Tractor use of	Fe 47
Data	No 28	Diesel	
Domestic methods compared with	No 28	Cetane number	Fe 35, Fe 37; Jl 35, Jl 36; No 27
Magnesium usage	Jl 29; Se 9, Se 19; No 29	Definition lacking	Jl (Sec. 2) 15

Abbreviations Used:

January, Jn
February, Fe
March, Mr

April, Ap
May, My
June, Je

Months of the year
July, Jl
August, Ag
September, Se

October, Oc
November, No
December, De

Fuels (Concluded)

Doped fuels	
Composition	Jl 35, Jl 36
Cost	Jl 36
End-point	Jl (Sec. 2) 15
Engine performance affected by	Jl 36
Fuel consumption affected by	Jl (Sec. 2) 15
Heating value	Jl (Sec. 2) 15
Ignition quality	Jl 35, Jl 36
Octane number	Fe 39
Power affected by	Jl (Sec. 2) 15
Quality variation	Jl (Sec. 2) 15
Research	Jl 35, Jl 36
Testing	Jl 35, Jl 36
Trends	Fe 39
Viscosity	Jl (Sec. 2) 15
Volatility	Jl (Sec. 2) 15
Gumming	Fe 36
Iso-butane	Mr 9
Mixtures, butane-propane	No 33
Octane number	Fe 34, Fe 35, Fe 36, Fe 39, Fe 40; Jl 27, Jl 41; Oc 26; No 27; De 10
Petroleum reserve, estimated	Ap 27
Present situation summarized	No 27
Propane	Fe 47; Mr 9
Rating, change proposed	Jl 41
Safety fuels	Ap 21; No 27
Specifications, number reduced	Ag 15
Substitute fuels, foreign	
Cost factor	Fe 40
Government attitude toward	Fe 40
Types of	Fe 40
Testing, suitability for all applications	Jl 41
Tractor	
Butane	Fe 47
Cost	Fe 39
Distillation range	De 10
Octane number	De 10
Propane	Fe 47
Specifications	
Proposed	De 10
Standard needed	De 10
Taxation effects	Fe 39
Test data	De 10
Trends	Fe 39, Fe 47

(See also Detonation, Fuel Factors; and Gasoline)

G**Gasoline**

Aviation	
Detonation testing	Fe 39
Progress	Jl (Sec. 2) 11, 12
Safety fuels compared with	Ap 21
Standardization trends	Fe 39
Trends	Fe 39
Vapor-locking tendencies	Mr 26
Cold weather operation	De 10
Future predicted	Mr 9
Gum content	
Factors involved	Mr 10
Reduction means	Mr 10
Octane number	Fe 34, Fe 35, Fe 36, Fe 39, Fe 40; Jl 27, Jl 31; No 27; De 10, De 25
Progress	Fe 39, Fe 40
Vaporization characteristics	De 10
Vapor-lock	
Altitude effects	No 21
Factors involved	No 21
Fuel cooling	No 21
Remedies suggested	No 21
Testing	Mr 26

(See also Detonation, Fuel Factors; and Fuels)

Golden Gate International Exposition

Jn 20; Ap 13; Jl (Sec. 2) 12, 13

H**Headlighting**

Driver cooperation needed	No 28
Polaroid	
Cost factor	Ap 26
Merits	Ap 26
Problems involved	Jn 21
Progress	Jn 21

Headlighting (Concluded)

Headlamps, sealed beam	
Country beam	Se 14; No 27, No 28
Development	No 27; De 22, De 24
Merits	Se 14; No 27, No 28
Progress	De 16, De 23
Safety factor	Se 14, Se 15; No 28
Traffic beam	Se 14; No 27, No 28
Types of	Se 14
Test data	No 28
Windshield, Polaroid, effects	Ap 26

Heat Treatment

Methods	Jl 45
Progress	Jl 45

Highways

(See Roads and Streets)

I**Ignition**

Breaker points	My 25
Distributors	Fe 36
Equipment	
Accuracy	Fe 36
Durability	Fe 36
Maintenance	My 25
Spark plugs	
Aircraft	
Sintered aluminum oxide	Jl (Sec. 2) 11
Sinterkorund	Jl (Sec. 2) 11
Timing	
Detonation affected by	Fe 34, Fe 35, Fe 36
Power affected by	Fe 34
Troubles	My 25

Indicators, Engine

Calibration problems	Fe 37
Cathode ray	Fe 37; Ap 26; Jl 41
Diesel engine use of	Fe 37
Electrical	Fe 37
Optical type	Fe 37; Jl (Sec. 2) 16
Pennsylvania State College type	Fe 37
Photo-electric	Fe 37
Pick-up unit used with	Fe 37
RCA type	Fe 37
University of Wisconsin type	Fe 37

Industrial Management

Humanics	Oc 26
Problems	Oc 26
Trends	Oc 26

Institution of Automobile Engineers Jn 22; My 23; Jl (Sec. 2) 19**Institution of Civil Engineers** Se 24**Institution of Mechanical Engineers** My 23; Se 24**Instruments**

Chassis dynamometer, portable	Jn 21
Gages, strain	Jl 26
Oscillograph	Ap 26
Profilometer	Mr 24, Mr 26; No 14, No 16
Strain gages	Jl 26
Stroboscope	Fe 36
Torque meter	Ap 20

International Air Traffic Association Ag 15**International Conference on Lubrication** My 23**International Standards Association** Ap 24; Je 14; Ag 15**Interstate Commerce Commission** Jl 51**K****Knock**

(See Detonation)

L**Legislation**

Motor-truck design	De 24
Taxation	
Design affected by	Jn 24; De 24
Foreign	Jn 24; Jl 18
Uniformity needed	Jl (Sec. 2) 8

SUBJECT INDEX

Lubricants and Lubrication

Boundary lubrication	
Mechanical aspects	Jl 41, Jl 42
Pressure	Jl 42
Temperature	Jl 42
Types of	Jl 42
Carbon-depositing tendencies	Jl 39
Cold-weather problems	Jn 22
Compound	
Addition agents	Jl (Sec. 2) 17
Engine, Diesel, use of	Jl 33
Merits	Jl 33
"Oiliness agents"	No 23
Problem involved	De 14
Spreading characteristics	Jl 33, Jl 34
Wear reduction due to	No 23
Diesel engine lubricants	Jl 33
Exhaust-gas analysis	Fe 14
Extreme-pressure	
"Seizure delay"	Mr 22
Seizure protection	Mr 22
Term criticized	Jl 42
Test cups	My 23
Extreme-pressure-temperature	Jl 42
Feritex process	Jn 24
Film strength	Jl 34
Function	No 23
Hesivity, molecular	Ap 26
Hypoid	Jl 42; De 10
Improvements needed	Jl 39
Lacquer formation	Jl 39
Oil-change periods	Fe 47
Oil deterioration	Jl (Sec. 2) 17
Oil properties	
Oiliness	Jn 24; Ap 26; Jl 34
Requirements	Jn 24; Jl 40
Oil reclamation	Ap 26
Oil types compared	Mr 22
Oils electrically treated	
Belgium Elektronic process	Jl 39
Merits	Jl 39
Oxidation	
Control	Jl (Sec. 2) 17
Testing	
Analine-point test	Jl 40
Conclusions listed	Jl 40
Correlation with service	Jl 40
Indiana test	Jl 40
Inhibitors	Jl 40
Reproducibility	Jl 40
Test correlation	Jl 40
Underwood apparatus used	Jl 40
Performance evaluation	Jl 40
Problems	Jn 24
Progress	Je 19; Jl (Sec. 2) 14
Sludge formation	Mr 11
"Solid lubricants"	De 10
Stability	
Carbon deposition relation to	Jl 39
Temperature relation to	Jl 40
Testing	Jl 39
Surface treatment	Jn 24
Temperature ranges established	Fe 47
Testing	
Laboratory	Jl 40
Oxidation	Jl 40; Jl (Sec. 2) 17
Small engine used	Jl 39
Stability	Jl 39
Trends	Jl (Sec. 2) 17
Viscosity, temperature relation to	Fe 47
(See also Automobile Operation and Performance; Engine Operation and Performance; Engines, Aircraft; Engines, Diesel; Engines, Motorcoach; Engines, Motor-Truck; Engines, Tractor; Fleet Operation; Motor-Truck Operation and Performance; and Oil Filters)	

Materials

A LOW-DENSITY AIRCRAFT MATERIAL	(E) Oc 12
FUNDAMENTAL CHARACTERISTICS OF MOLDABLE PLASTICS	(P) Oc 9
Duramold	
Aircraft use of	Jl 28; Oc 12
Duralumin compared with	Oc 12
Merits	Jl 28
Properties	Oc 12
Specific gravity, low	Jl 28

Materials (Concluded)

Glass, safety	Jl 50, Jl 51
Plastics	
Aircraft use of	Fe 29; Jl 28
Metal reinforcement	Fe 29, Fe 30
Moldable	
Applicability chart	Oc 12
Cellulose-acetate	Oc 10
Characteristics of	Oc 9, Oc 11, Oc 12
Impact resistance	Oc 10
Methyl Methacrylate	Oc 10
Phenolics	Oc 9, Oc 10
Polystyrene	Oc 12
Thermoplastic	My 15, Oc 9
Thermosetting	My 15, Oc 9
Urea	Oc 10
Stability	
Factors involved	Ag 10
Types of	Ag 10, Ag 11
Weight reduction	
Designer's part in	Ag 12
Importance of	Ag 9, Ag 12
(See also Metals and Rubber)	
Metals	
USE OF MAGNESIUM ALLOYS IN THE EUROPEAN AUTOMOTIVE INDUSTRY (P) Se 9	
Cleaning problem	
Aircraft	No 31; De 13
Automobile	No 31; De 13
Dye-research helps solve	No 31
Research	No 31
Cutting	
Cost factor	De 13, De 14
Materials used	De 13, De 14
Time factor	De 13, De 14
Elektronmetal	Se 9
Fabricating method	De 23, De 24
Iron, malleable	
Annealing	Jl 44
Automotive applications	Jl 45
Castings	Jl 44
Merits	Jl 44, Jl 45
Physical properties	Jl 44, Jl 45
Magnesium	
Aircraft use of	Jl 29; Se 18; No 21, No 22, No 29
Alloys	Se 9, Se 10, Se 12, Se 13, Se 17, Se 18, Se 19
Aluminum compared with	Se 10
Applications	Jl 29; Se 13, Se 17, Se 18, Se 19; No 22
Castings	Se 12, Se 17, Se 18, Se 19; No 22
Corrosion resistance	Jl 29; No 21, No 22
Cost factor	Se 9, Se 10, Se 18
Dies, production problems	No 22
Fire hazard	Jl 29; Se 13
Foreign and domestic use compared	No 29
Future predicted	Se 13
History	Se 9
Merits	Se 10, Se 12, Se 13
Progress, European	No 22
Propeller blade material	No 22
Railcar use of	Se 13, Se 17
Temperature effects	No 21, No 22
Weight saving	Se 13, Se 18, Se 19
Welding characteristics	Se 19
Stability	
Factors involved	Ag 10
Types of	Ag 10, Ag 11
Weight reduction	
Designer's part in	Ag 12
Importance of	Ag 9, Ag 12
(See also Aluminum and Aluminum Alloys; Bearings; Corrosion and Corrosion Prevention; and Steels)	

Motor

(See Engine)

Motorcoach Design and Construction

Air conditioning	No 33, No 34
Aluminum used in	Jl 30
Hoodless type	Jn 21
Seat-spacing	No 33
Stability	Jl 30
Stresses	Jl 30
(See also Bodies; Engines, Motorcoach; Motorcoach Operation and Performance; and Transmissions)	

S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

Motorcoach Operation and Performance

City lines	No 32
Cost control	No 32
Hoodless type usage	Jn 21
Maintenance	
City lines	No 32
Cost factor	Jn 20, Jn 21; No 32
Inspection	Fe 48; De 12
Methods	Oc 25
Passenger comfort	Jn 20, Jn 21
Problems involved	Jn 20, Jn 21; Oc 25; No 32, No 33
Seat-spacing factor	Jn 21; No 33

(See also Accidents and Accident Prevention; Bodies; Engines, Motorcoach; Fleet Operation; Motorcoach Design and Construction; and Transmissions)

Motor-Truck Design and Construction

Accessibility	De 12
CA dimension standardization	De 24
Cab-over-engine type	De 12
Criticism	De 12
Design described, parcel delivery	De 26
Factors affecting	De 24
Future predicted	De 24
Legislation effects	De 24
Maintenance man's contribution to	Fe 48
Military requirements	Ap 24
Parcel delivery requirements	De 26
Progress	De 12
Types	
Number of	Jl (Sec. 2) 8
Simplification needed	Jl (Sec. 2) 8
Weight reduction, importance of	Ag 9

(See also Axles; Bodies; Brakes; Engines, Motor-Truck; Motor-Truck Operation and Performance; Springs, Suspension; and Tires and Rims)

Motor-Truck Operation and Performance

Cost trends	De 12
Economic aspects of	Jl (Sec. 2) 7, 8
Engineered maintenance	Jl (Sec. 2) 6, 7
Factors affecting	Jl 32; Jl (Sec. 2) 6
Fleet operation, public utility	Jl 32; Jl (Sec. 2) 6
Lubrication	
Oil changing	Oc 26
Oil filter effects	Oc 26
Oil type effects	Oc 26
Testing	Oc 26
Maintenance	
Accessibility requirements	De 12
Army methods	No 32
CCC motor transportation methods	No 32
Cost reduction	No 32
Cost trends	De 12
Design relation to	Jl (Sec. 2) 7
Devices listed	Oc 25
Driver relation to	No 32
Engineered	Jl (Sec. 2) 6, 7
Inspection	No 32; De 12
Instrumentation for	Oc 25
Operating conditions, effect of	Fe 48
Overhaul	No 32
Preventive	No 32; De 12
Mileage	Fe 48
Number in operation	Fe 48
Oil industry problems	Mr 23
Progress	Jl (Sec. 2) 7, 8
Railroad use of	Jl (Sec. 2) 8
Public utility fleet operation	Jl 32; Jl (Sec. 2) 6
Supercharger effects	No 34
Tires, balloon	
High-pressure compared with	Fe 50
Merits	Fe 50
Usage increase	Jl (Sec. 2) 7, 8
Vehicle selection	Jl (Sec. 2) 8

(See also Accidents and Accident Prevention; Axles; Bodies; Brakes; Engines, Motor-Truck; Fleet Operation; Motor-Truck Design and Construction; Springs, Suspension; and Tires and Rims)

N

National Advisory Committee for Aeronautics

Fe 28, Fe 29; Ap 10, Ap 22; Je 14

National Board of Fire Underwriters

Je 16

National Defense

Aircraft	
Diesel use	Fe 17, Fe 18
Maintenance problems	Fe 20

National Defense (Concluded)

Strength	
Foreign and domestic compared	Fe 17
Need analyzed	Fe 17
Trends	Fe 20
Automotive ordnance	Fe 18, Fe 20
Aviation, military value of	Ap 25; No 13, No 16
Commercial vehicles	
Modification	Fe 18, Fe 19, Fe 20
Needs	Fe 18
Dinner	Fe 13, Fe 15
Engineering cooperation	Fe 18, Fe 19
Engines, Diesel	Fe 17, Fe 18
Industrial cooperation	Fe 18
Industry's relation to	Fe 13
Military motor-vehicle development	Ap 24
Mobilization, industrial	Fe 19
National Industrial Preparedness Dinner	Ap 24
Past and present compared	Fe 18, Fe 19
Preparedness	Fe 17, Fe 19; Ap 24
S.A.E. cooperation	Ap 24; My 22
S.A.E. Defense Day program	Fe 17
Tanks	Fe 20
Time factor	Fe 18, Fe 19, Fe 20
Transportation, land	
Problems	Fe 19
Standardization	Fe 20

Navy

Aircraft	
Maintenance	Je 16
Problems	Fe 18, Fe 20
Standards	Fe 14
Naval Aircraft Factory	Fe 20
Screw-thread standardization	No 30

New York World's Fair

Jn 20; Ap 13; Jl 14, Jl 36, Jl 37

O

Oil

(See Lubricants and Lubrication)

Oil Coolers

Cost factor	No 22
Diesel engine use of	No 22
Disadvantages	Jl 48
Merits	Jl 48; No 22
Oil temperature control	No 22
Problems	No 22
Selection of	No 22
Test data	No 22

Oil Filters

Absorbent type	No 12
Cold weather effects	Fe 33
Cost factor	Fe 33, Fe 34; No 12
Efficiency	Fe 47; Oc 26
Engine temperature effects	Fe 33
Factors affecting use of	Fe 33, Fe 34
Failure causes	No 12
Fallacies connected with	Ap 24
Fleet experience with	Fe 33, Fe 34; Ap 24
Function	Ap 24; No 12, No 22
Limitations	Jn 22; Fe 33, Fe 34
Lubricant type effects	Fe 34
Merits	Fe 33, Fe 34; No 12
Oil oxidation effects	Fe 33
Progress	No 12

Omnibus

(See Motorcoach)

P

Passenger Car

(See Automobile)

Petroleum Industry

Future predicted	Jl 35
Petroleum derivatives and applications, future	Jl 35
Progress	Jl 35

Petroleum Motor Transport Association

No 24

Pistons

Cast iron	Fe 37
Crown	Fe 37
Material effects	Jn 26
Rings	
Break-in period	De 25
Coating	
Brake horsepower increased by	De 25
Classes of	Jl (Sec. 2) 19

SUBJECT INDEX

Pistons (Concluded)

Feritex	Jl (Sec. 2) 19
Ferrox	Jl (Sec. 2) 19
Grafotox	Jl (Sec. 2) 19
Granoseal	Jl (Sec. 2) 19
Graphitox	Jl (Sec. 2) 19
Merits	De 25
Progress	Jl (Sec. 2) 19
Scuffing prevented by	Je 16; Jl 24
Tin	Je 16; Jl 24
Types described	De 25
Wear affected by	Jl (Sec. 2) 17, 19
Cylinder wear affected by	Jl (Sec. 2) 17, 18, 26
Design, importance of	Oc 26
Diesel	Ap 29
Life	Mr 11; Jl (Sec. 2) 19
Materials	Jn 26; Je 16; Oc 26
Scuffing	De 25
Sticking	Fe 36; Ap 29
Testing	Jl (Sec. 2) 17
Trends	Mr 11; Oc 26
Wear	
Coating effects	Jl (Sec. 2) 19
Factors affecting	Jl (Sec. 2) 19
Lubricant effects	Jl (Sec. 2) 19
Superfinish	Fe 38

Planetarium, Zeiss Optical

Production

Aircraft and automobile problems compared	Jn 23
Brazing, electric-furnace	
Merits	De 26
Process described	De 26
Casting	
Cylinder blocks	Fe 25
Magnesium	Se 12, Se 13, Se 17
Cost factor	Fe 25, Fe 26
Weight factor	Fe 25, Fe 26
Welding compared with	Fe 25
Cylinder blocks, cast vs. welded	Fe 25, Fe 26
Design relation to	Mr 26
Electric-furnace brazing	De 26
Finish	
Profilometer used to measure	Mr 24, Mr 26
Superfinish	Ap 25; My 16; No 22
Surface finish measurement	Mr 24, Mr 26
Wear reduced by	No 23
Forging, magnesium	Se 19
Hardening, induction method	No 29, No 30
Iron, malleable	Jl 44, Jl 45
Light weight construction	

SOME ENGINEERING PROBLEMS OF LIGHT-WEIGHT CONSTRUCTION

Definition	(P) Ag 9
Factors involved	Ag 9
Importance	Ag 10
Material effects	Ag 9
Shot welding	Ag 10, Ag 11
Stability effects	Ag 12
Weight reduction	Ag 11
Designer's part in	Ag 12
Importance of	Ag 9, Ag 12
Materials used in	Jn 21
Riveting	
Aircraft	Ap 10
Flush	Ap 10
Superfinish	
Definition	Ap 25
Description	Ap 25; My 16
Limitations	Ap 25
Merits	Ap 25; No 22
Wear affected by	Ap 25
(See also Aircraft Design and Construction, Production; Automobile Design and Construction, Production; Metals; and Welding)	

R

Racing, Automobile

Advances credited to	Jl 42
Car design affected by	Jl 42
Foreign and domestic compared	Jl 24
Indianapolis Speedway	Jl 42

Railcars

Air conditioning	Mr 22
Diesel-electric streamliners	
Development problems	My 28
Operating difficulties	My 28
Magnesium used in	Se 13
Makes, Burlington Zephyr	Mr 22
Progress	De 14, De 16

Railcars (Concluded)

Streamliners, Diesel-electric	
Streamlining	Mr 22; De 16
Weight reduction	Mr 22

(See also Engines, Railcar)

Railroads

(See Transportation)

Research

Automotive, University of California	
Aviation	No 33
Cost	Je 15; Ag 14
Definition	Ag 14
Examples of	Jl 15
Future possibilities	Jl 48
Government support of	Jl 48
Importance of	Ag 14
Metal cleaning	Je 15, Je 16; Jl 14; Ag 14
Rubber	No 31
Savings from	No 30
Types of	Ag 14

Rims

(See Tires and Rims)

Roads and Streets

"Futurama," General Motors	No 26
Future predicted	Jl (Sec. 2) 17; No 26
High-speed	Jl (Sec. 2) 17
Highway safety progress	Jl 15
Research	No 26
Traffic control	
Accident factor	Fe 47, Fe 48
Future predicted	No 26
Improvements needed	Fe 47, Fe 48
Legislation factor	Fe 48
Problems involved	Fe 47, Fe 48

Royal Aeronautical Society

Rubber

Automotive use of	No 30
Body seat materials	Fe 27, Fe 28
Bond stresses in	Fe 32
Dynamic fatigue life	
Increase in	No 30
Research	No 30
Test data	No 30
Latex, foamed	Fe 27, Fe 28
Research	No 30
Springs, suspension	Mr 9; Je 16
Testing	
Technical committee formed	My 22
Uniform method needed	My 22
Vibration effects	No 30

S

S.A.E.

YOUR SOCIETY—FINANCES	(P) Mr 7
YOUR SOCIETY—MEETINGS	(P) Oc 17
YOUR SOCIETY—PUBLICATIONS	(P) My 13
Accident prevention, cooperation in	Fe 33; Jl 51
Clarkson, Coker F., Memorial Fund	De 9
Committees	
Administrative	
Meetings	Jn 20, Jn 25; Fe 43; Ap 13; Jl 18
Membership	Fe 43
Publication	Fe 43; My 13, My 14
Sections	Fe 45; My 27
Automotive Railroad	Mr 10
Engineering Relations	Fe 13; Jl 51; De 16
Finance	Mr 7, Mr 8
Nominating	Fe 13
Ordinance Advisory	Fe 20
Research	Fe 43
Congress Advisory Board	Jl 18
Constitution	
Amendment	Fe 14; Ap 17
By-law changes	My 27
Cooperation	
Companies in industry	Je 10, Je 11
Success due to	Jl 18
Council	Fe 21, Fe 24, Fe 41; My 27
Educational nature of	De 14
Finances	
Budgeting	Mr 7
Finance Committee	Mr 7, Mr 8
Policies	Mr 7, Mr 8
Treasurer	Mr 8
Treasurer's report	Fe 46

S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

S.A.E. (Continued)

Horning Memorial Award	PAGE Jl 25
Horsepower rating formula wrongly attributed to	No 26
Meetings	
Annual	Jn 13, Jn 14, Jn 15, Jn 19; Fe 13; Jl 45; Ag 14; Se 15; Oc 22; No 24; De 15, De 21
Annual Dinner	Je 17; Jl 45; Ag 14; Se 15; Se 16; Oc 13, Oc 22; No 11
Company cooperation	Je 10, Je 11
Conduct of	Oc 18
Council approval	Oc 18
Discussion, phonograph recording of	Jl (Sec. 2) 8, 9
Engineering displays	Jn 15; Fe 30; Se 15; Se 16; Oc 22; No 13, No 24; De 21
Importance of	Oc 17
Inspection trips	Jn 20; Ap 10; Jl 43
Meetings Committee approval	Oc 18
National Aeronautic	Jn 19; Fe 40; Mr 8, Mr 11; Ap 9
National Aircraft Production	Mr 24; Je 17; Jl 45; Ag 14; Se 15; Oc 14, Oc 22; No 13
National Fuels and Lubricants	Mr 22; Jl 45; Ag 14; Se 15, Se 16; Oc 15, Oc 22; No 20, No 24; De 10
National Tractor	Je 17; Jl 45; Ag 14; Se 15; Se 16; No 12
National Transportation Engineering	Oc 24
National Transportation and Maintenance	Jl 45; Ag 14; Se 15, Se 16; Oc 14, Oc 22; De 11
Photographic contest and exhibit	Jn 15; Fe 27
Preparation for	Oc 17, Oc 18
Professional Activity participation	Oc 17
Section cooperation	Fe 45
Summer	De 21
Transportation and Maintenance Public Utility	Fe 49
Truck, Bus and Railcar	Mr 22; De 14
Types of	Oc 17, Oc 18
West Coast Transportation and Maintenance	No 32
World Automotive Engineering Congress	
Jn 19, Jn 20, Jn 22, Jn 25; Fe 24A, Fe 40; Mr 8, Mr 12; Ap 13, Ap 14, Ap 15, Ap 16, Ap 27; My 9, My 16, My 19; Je 9, Je 10, Je 11, Je 14, Je 17; Jl 13, Jl 18, Jl 42, Jl 43, Jl (Sec. 2) 4	
Membership	
Applicants qualified	Jn 16; Fe 42; Mr 20; Ap 23; My 17; Je 17; Jl 54; Ag 18; Se 19; Oc 18; No 20; De 20
Applications received	Jn 16; Fe 42; Mr 21; Ap 23; My 18; Je 18; Jl 56; Ag 18; Se 26; Oc 19; No 19; De 20
Fellow grade proposed	My 27
Junior age limit	No 20
Life, award of	Fe 13
Obituaries	Jn 19; Mr 19; Ap 19; My 21; Je 13; Jl 53; Ag 16; Oc 21; No 18; De 19
Personal Notes	Jn 18; Fe 41; Mr 18; Ap 18; My 20; Je 12; Jl 46; Ag 16; Se 20; Oc 20; No 17; De 17
Service, voting privileges for	Fe 14; Ap 17
Officers	
Election	Fe 41
Nominees	Oc 16
President	Fe 21
Treasurer	Mr 8
Vice-Presidents	Fe 22, Fe 23
Organization	Mr 23
Placement service	Mr 9
Professional Activities	
Aircraft	Fe 22, Fe 29; Ap 9
Aircraft-engine	Fe 22, Fe 31; Ap 9
Diesel-engine	Fe 23, Fe 37
Fuels and Lubricants	Fe 22, Fe 35; De 10
Passenger-car	Fe 23, Fe 26
Passenger-car body	Fe 23, Fe 27
Production	Jn 20; Fe 23
Tractor and Industrial Power Equipment	Fe 22; No 12
Transportation and Maintenance	Fe 23, Fe 33; De 11, De 12
Truck, Bus and Railcar	Fe 19, Fe 22; De 11, De 14
Publications	
Advertising appeal	My 14
Editing	My 14
Journal	Fe 43; My 13, My 14
Paper selection	My 13, My 14
Roster	Fe 43; Mr 18; My 13, My 14
Transactions	Fe 43; My 13, My 14
Research	
Fuels	Fe 44; My 23
Highways	Fe 44; My 23
Ignition	Fe 44
Lubricants	
Aircraft engines	Fe 43
Extreme pressure	Fe 44; My 23
Oil stability	Fe 44; Jl 40
Oiliness	Fe 44; My 23
Riding-comfort	Fe 44; My 23

S.A.E. (Concluded)

Scope	PAGE My 13, My 14
Sections	
Baltimore	Jn 19; Fe 38, Fe 40, Fe 47; Mr 8, Mr 11; Ap 27; My 19, My 26; Se 25; Oc 22, Oc 26; No 24; De 21, De 22
Buffalo	Jn 19, Jn 23; Fe 40; Mr 8; My 19; No 24; De 21
Canadian	Jn 19; Fe 40; Mr 8, Mr 11; Ap 27; My 15, My 16, My 19; Je 14; Ag 15; Se 24; No 23, No 27; De 21, De 24
Chairmen	Se 22, Se 23
Chicago	Jn 19; Fe 39, Fe 40; Mr 8; Ap 27; My 16, My 19, My 28; Je 15; Jl 18, Jl 27; Oc 22, Oc 26; No 24, No 31, No 33; De 14, De 21
Cleveland	Jn 19, Jn 21; Fe 40; Mr 8, Mr 17; Ap 27; My 19, My 26; Jl 52; Oc 22; No 24, No 27; De 21
Colorado Club	Fe 45; Oc 23
Dayton	Ap 26; My 19; Jl 48; Oc 22; No 24
Detroit	Jn 19, Jn 20, Jn 24, Jn 27; Fe 40; Mr 8; Ap 27; My 16, My 19, My 28; Je 16; Jl 18, Jl 43, Jl 48; Oc 22, Oc 25; No 24, No 30; De 21, De 22
Field editors	Jn 20; Fe 38; My 13, My 15; Je 14; No 27; De 23
Indiana	Jn 19, Jn 20, Jn 25; Fe 40; Mr 8, Mr 17; Ap 14, Ap 24, Ap 27; My 10, My 24; Jl 18, Jl 42, Jl 43; Oc 22; No 24; De 21, De 23
Junior members eligible for office	My 27
Kansas City	Jn 19; Fe 40; Mr 8; Je 16; Oc 22; No 24
Meetings	Oc 17, Oc 18
Metropolitan	Jn 19, Jn 20, Jn 22; Fe 40; Mr 8, Mr 9; Ap 13, Ap 27; My 19, My 22, My 23, My 28; Jl 15, Jl 18; Se 24; Oc 22, Oc 26; No 24, No 26; De 16, De 21
Milwaukee	Jn 24; Fe 40; Mr 8; Ap 27, Ap 31; My 19, My 24; Je 17; Jl 49; Se 24; Oc 22, Oc 23, Oc 26; No 24, No 26; De 21, De 26
New England	Jn 19, Jn 21; Fe 40, Fe 46; Mr 8; Ap 25, Ap 27; My 16, My 19; Je 19; Oc 23; No 24; De 21, De 23
Northern California	Jn 19, Jn 20, Jn 21; Fe 40, Fe 47; Mr 8; Ap 26, Ap 27; My 19, My 22; Jl 18, Jl 48, Jl (Sec. 2) 5; Se 24; Oc 21, Oc 23; No 24, No 27, No 28; De 21
Northwest	Jn 19, Jn 20, Jn 27; Fe 40, Fe 47; Mr 8; Ap 27; My 19; Se 24; Oc 26; No 31, No 34
Officers	Ag 13; De 22, De 23
Oregon	Jn 19; Fe 40, Fe 48; Ap 27; My 19; Ag 15; Oc 23; No 24; De 21, De 25
Philadelphia	Jn 19, Jn 24; Fe 38, Fe 40; Mr 8; Ap 24, Ap 27; My 19; Oc 23, Oc 24; De 26
Pittsburgh	Jn 19, Jn 21, Jn 22; Fe 40; Mr 8, Mr 9; My 19, My 25; Oc 23, Oc 26; No 23, No 24; De 25
St. Louis	Jn 19, Jn 25; Fe 40; Mr 8, Mr 11; Ap 27; My 26; Je 14; Ag 15; Oc 23, Oc 25; No 25, No 33, No 34; De 11, De 21
Southern California	Fe 39; Mr 8, Mr 17; Ap 25, Ap 27; My 27, My 28; Je 15; Je 17; Jl 18, Jl (Sec. 2) 5; Ag 14; Oc 23; No 13, No 24, No 34; De 21
Southern New England	Jn 19, Jn 28; Fe 38, Fe 40; Mr 8, Mr 10; Ap 27; My 19; Oc 23; No 24, No 29; De 21, De 26
Syracuse	Jn 19, Jn 26; Fe 40; Mr 8; Ap 27; My 19; Oc 23; No 24; De 21
Tulsa Group	Jn 27; Fe 45, Fe 47; Mr 9; My 16; Jl 51; Oc 26; No 23, No 33; De 10
Virginia-Carolina Group	De 24
Washington	Jn 19, Jn 27; Fe 40; Mr 8; Ap 9, Ap 26, Ap 27; My 15, My 19; Je 19; Oc 23; No 24, No 31
Student activities	
Debate	De 10
Detroit Institute of Technology	My 26
General Motors Institute	Jn 26; Ap 31; Ag 14
Massachusetts Institute of Technology	Jn 26
New York University	Jn 25
Ohio State University	Jn 26; Mr 10, Mr 17; Ap 26, Ap 27; Je 16
Oregon State College	Jl 49; No 25, No 32
Paper competition	Jn 27; Ap 26; My 26; Jl 48, Jl 49
Progress	Fe 45
Section cooperation	Jn 24
University of Detroit	Jn 26; Se 16
University of Oklahoma	Jn 26; Jl 51; No 20; De 10
University of Wisconsin	Ap 31; My 24; Jl 50; No 26; De 26
Value of	Mr 23
(See also Cooperative Fuel Research; and Standardization Activities, S.A.E.)	
Safety	
(See Accidents and Accident Prevention)	
Science	
Democracy relation to	No 11
Living standards affected by	No 11
War affected by	No 11
Societe des Ingenieurs de l'Automobile	Jl 14, Jl 49, Jl 50

SUBJECT INDEX

Springs, Suspension

Front-wheel	
Design described	Jl 49
Factors affecting	Jl 49
Leaf	Jl 49
Tire wear	Jl 49
Progress	Jn 21
Rubber used in	Mr 9; Je 16
Tire wear affected by	Jl 49
Torsilastic	Je 16
Torsion type	Je 16
Trends	Mr 9

Standardization

Aeronautical	Ap 24; Je 14
Aircraft, international, S.A.E. cooperation	Ap 24; Je 14
International	Ap 24; Je 14

Standardization Activities, S.A.E.

Aeronautical Field, Standardization in	Jl 51
Aircraft materials	No 20
American Society for Testing Materials cooperation	Ap 30
American Standards Association cooperation	Fe 46; Mr 11
Ball and roller bearing	Mr 11; Ag 15
Bolts and nuts	No 23
Committee report	Fe 45
Electrical equipment, voltage for Diesel-Electrical Systems	Mr 11
Engine testing forms	Se 24
Glass, safety	Jl 50, Jl 51
Handbook	Fe 46; Mr 11; My 13, My 14, My 15
Headlighting	Se 14
International activities	Fe 46; Ap 24; Je 14
Lubricant, temperature ranges established	Fe 47
Motor Vehicle Inspection Code	Se 24
Parts and fittings, speedometer drives	Mr 11
Progress	Fe 46
Revisions	Mr 11
Rubber	
Advisory committee proposed	Ap 30
Products	Jl 50; Se 25; De 23
Screw threads	Oc 22; No 30
Splines, involute	No 23
Standards Department	My 14
Taps	No 23
Trailer coupling	My 23
Value of	Fe 46

Steels

SOME ENGINEERING PROBLEMS OF LIGHT-WEIGHT CONSTRUCTION

	(P) Ag 9
Aluminum compared with	Jn 11; Jl 30; Ag 11
Corrosion resistance	Jn 11, Jn 12; Jl 30
Corten	Ag 11
Cutting, tests on	Jl 51
Cylinder blocks, welded	Fe 25, Fe 26
Fabricating methods	De 23, De 24
Railroad use of	Jn 9, Jn 11, Jn 12
Shotwelding	Ag 12
Stability	Jl 30
Stainless	
Aircraft use of	Mr 24
Merits	Ag 11, Ag 12
Railcar use of	Ag 12
Strip usage	Ag 12
Valve	Fe 32; Mr 17
Weight reduction	
Designer's part in	Jl 30; Ag 12
Importance of	Ag 9, Ag 12
Welded cylinder blocks	Fe 25, Fe 26

Streets

(See Roads and Streets)

Superchargers and Supercharging

Aircraft	
Altitude performance	Jl (Sec. 2) 10
Power affected by	Jn 22
Turbo type	Jl (Sec. 2) 10
Automobile	
Future predicted	Ap 26
Types	Ap 26
Centrifugal type	Jl 24; No 34
Diesel engine	Je 19
Fuel consumption affected by	No 34
Performance data	Ap 29
Power affected by	No 34
Racing engine use	Jl 24
Roots type	Jl 24; No 34
Time saved by	No 34
Types compared	Ap 20, Ap 29; No 34
Vane type	No 34

Television

Commercial	Fe 14
Domestic	Fe 14
Factors involved	Fe 14
Foreign	Fe 14

Testing

Aircraft	
Fire hazards	Ap 21
Flight	Jl 28
Automobile	
Car performance	Jn 21; Jl 32, Jl 33; No 23, No 26; De 23
Proving ground	
Advantages	No 23, No 26
Cost data	No 26
Road testing compared with	No 23
Safety factor	No 23, No 26
Road and proving ground compared	No 23
Fuel	
Diesel	Jl 35, Jl 36
Suitability for all applications	Jl 41
Gasoline, vapor-locking tendencies	Mr 26
Lubricants	
Bearing corrosion	Jl 40
Oil oxidation	Jl 40, Jl (Sec. 2) 17
Performance evaluation	Jl 40
Stability	Jl 39
Road testing of automobiles	Jl 32
Rubber, uniform method needed	My 22
Tires	Jl 20

(See also Detonation, Testing; and Instruments)

Tires and Rims

Aircraft	No 14
Blowouts	Fe 26
Bulge gage	De 12
Car control	
Blowouts	Fe 26
Braking	Fe 26
Speed	Fe 26
Steering	Fe 26
Tire leakage	Fe 26
Car stability affected by	Jl 20
Cornering ability	Fe 26
Failures	
Standardization of terminology needed	Fe 26
Type	Fe 26
Hysteresis loop, speed effects	Fe 27
Improvements suggested	Fe 26
Life, trends	Fe 26
Mileage data	De 12
Motor-truck, balloon	
High-pressure compared with	Fe 50
Merits	Fe 50
Pneumatic	Fe 26, Fe 27
Rating, new method of	
Criticism	Fe 26
Suggestion	Fe 26
Recapping	De 11, De 12
Retreading	
Age factor	De 11, De 12
Balance	De 12
Cost factor	De 12
Field experience	De 11, De 12
Results	De 11
Rules governing	De 11
Rim width	
Cornering ability affected by	Fe 26
Trends	Fe 26
Rolling resistance	Fe 26
Rubber used in	No 30
Size	
Intervals	Oc 24
Suggestion regarding	Oc 24
Skid-Pad Test	Jl 20
Stability	
Factors affecting	Jl 20
Test results	Jl 20
Steering control affected by	Jl 20
Testing, tire properties	Jl 20
Wear	
Factors affecting	Fe 26
Springs, suspension effects	Jl 49
Temperature effects	Fe 26

Tractors, Farm

Air Cleaner Test Code proposed	No 23
Automobile problems compared with	Jl 29
Cost factor	Fe 47

S.A.E. JOURNAL - GENERAL EDITORIAL SECTION

Tractors, Farm (Concluded)

Engine trends
Equipment, auxiliary
Progress
Rice field use of
Tires
Track-type merits
Types

(See also Engines, Tractor)

Tractors, Industrial

Applications
Design problems
Earth-moving type
Track-type merits

Traffic

(See Roads and Streets)

Trailers

Couplings, king-pin design for
Semi-trailers, fifth-wheel location

Trans-Canada Air Service

Transmissions

Automatic

Fuel consumption affected by
Hydrodynamic
Definition
Efficiency
Fuel consumption affected by
Heat effects
Hydraulic compared with
Problems

Merits

Progress
Types compared

Design described

Electric merits
Elimination suggested
Fluid flywheel

Cost factor
History
Limitations
Merits

Metal used in

Four-wheel drive

Controllability

Cost

Merits

Motor truck

Function

Gearshifting

Hydra-Matic

Hydraulic, field for

Motorcoach, types used

Motor-truck

Four-wheel drive

Trends

Multi-speed

Overdrive

Planetary

Progress

Synchromesh

Trends

Weight data

(See also Electric Drive)

Transportation

Costs

History

Motor-vehicle

Operating conditions, Western and Eastern compared

Oregon State College contribution to

Requirements, Western

Western contribution to

Railroad

LIGHT-WEIGHT PASSENGER CARS FOR RAILROAD SERVICE

Articulation

Automotive engineers' cooperation

Equipment progress

History

Light-weight trains

Conventional type compared with

Cost factor

Materials used in

Progress

PAGE

Fe 47
Fe 47
Jl 29
Jl 29
Fe 47
Jl 29
Fe 47

Jl 29

De 13

De 13

Jl 29

My 23

My 23

My 15

Jl 30

Jl 18

Jl 17, Jl 18

Jl 17

Jl 18

Jl 18

Jl 18

Jl 30

De 16, De 22

Jl 30

De 22

Jl 30

Jl 30

Jl 45

Ap 26

De 24

Ap 26; Jl 30

Ap 26

Jn 27

Jn 27

Jn 27

Jn 27

Jl 30

Jl 17; De 22

De 16, De 23, De 26

Jl 30

Jl 30

Jl 30

Jn 27

De 24

De 13

Jl 45; De 25

Jl 30

Jn 25

Jl 30; De 24

Jn 21

Jl 30

Transportation (Concluded)

Safety
Steel cars, introduction of
Stresses studied
Testing
Usage extent
Welding, spot and arc
Locomotives, steam and Diesel compared
Motor-truck used by
Progress
Safety
Standardization needed
Streamlined trains
Air conditioning
Problems
Types
Braking problems
Development
Lighting
Progress
Trends
Weight reduction
Aluminum and steel compared
Articulation as means
Importance of
Limitations on
Progress
Steel and aluminum compared

Truck

(See Motor-Truck)

U

United States Department of Commerce

United States Maritime Commission

V

Valves and Valve-Gear

Aircraft

Failure causes
False motion
Definition
Effects
Hydraulic lash adjuster
Progress
Seating velocity
Sleeve
Poppet compared with
Single
Trends
Temperature reduction, importance of
Timing
Cooling, sodium
Design factors affecting
Exhaust, nickel-chromium
Hydraulic lash adjuster
Progress
Sleeve
Aircraft use
Merits
Poppet compared with
Single
Trends
Spring pressures
Steels
Trends

W

War, European

Balloon barrage
Comments on
Neutral countries

Welding

Arc-welding
Cylinder blocks, steel
Casting compared with
Cost factor
Problems
Progress
Weight factor
Problems
Shotwelding
Merits
Spotwelding differentiated from
Time element
Spotwelding

PAGE

Jn 11
Jn 10
Jn 12
Jn 12
Jn 9
Jn 12
My 28
Jl (Sec. 2) 8
Jn 9, Jn 10, Jn 12
Jn 10, Jn 11
Jn 12

De 14
De 14
De 14
De 14, De 16
De 14
Jn 9, Jn 10, Jn 11; De 16
De 14

Jn 12
Jn 12
Jn 10
Jn 11
Jn 10
Jn 12

No 30

Ap 26; No 25

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32

Fe 32